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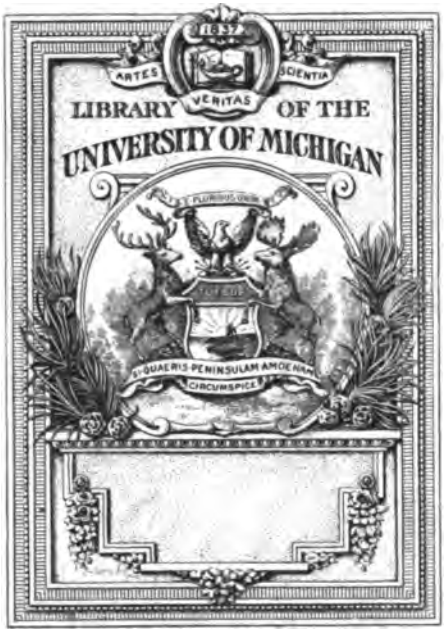
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JOURNAL

33901

OF THE

AMERICAN GEOGRAPHICAL SOCIETY

OF

NEW YORK.

EDITED BY THE RECORDING SECRETARY.

M.DCCC.LXXIII.

VOL. IV.

PRINTED FOR THE SOCIETY BY THE STATE OF NEW YORK.
LONDON: TRÜBNER & CO.—PARIS: GUST. BOSSANGE.
1874.

THE ARGUS COMPANY,
PRINTERS AND STEREOTYPERS,
ALBANY, N. Y.

STATE OF NEW YORK.

No. 168.

IN ASSEMBLY,

March 28th, 1873.

ANNUAL REPORT

OF THE

AMERICAN GEOGRAPHICAL SOCIETY OF NEW YORK FOR THE YEAR 1872.

ROOMS OF THE AMERICAN GEOGRAPHICAL SOCIETY,
COOPER INSTITUTE,
NEW YORK, *March 28th*, 1873.

Hon. A. B. CORNELL,
Speaker of the Assembly:

SIR,—I have the honor to transmit herewith the annual report of the American Geographical Society of New York for the year 1872.

Very respectfully,

Your obedient servant,

DR. E. R. STRAZNICKY,
Recording Secretary.

AMERICAN GEOGRAPHICAL SOCIETY.

OFFICERS AND COUNCIL, 1873.

PRESIDENT,
CHARLES P. DALY, LL. D.

VICE-PRESIDENTS,
F. A. CONKLING, FRANCIS A. STOUT,
T. BAILEY MYERS.

HONORARY SECRETARY,
REV. JOSEPH P. THOMPSON, D. D.

FOREIGN CORRESPONDING SECRETARY,
JAMES MÜHLENBERG BAILEY.

DOMESTIC CORRESPONDING SECRETARY
W. H. H. MOORE.

RECORDING SECRETARY,
E. R. STRAZNICKY, M. D., PH. D.

TREASURER,
HENRY CLEWS.

COUNCIL,
WILLIAM REMSEN, GEORGE W. CULLUM, U. S. A.,
W. TILDEN BLODGETT, GEORGE CABOT WARD,
WILLIAM E. CURTIS, ELIAL F. HALL,
THEO. W. DWIGHT, LL. D., THEODORE ROOSEVELT,
WILLIAM JONES HOPPIN.

CONTENTS.

PAGE.

List of Officers and Council v

Charter of Incorporation 2

Amended Charter 4

By-laws 6

Honorary, Corresponding, and Resident Members 16

Transactions of the Society for 1872 36

Alphabetical List of Donors to the Library and Map-room 57

PAPERS READ BEFORE THE SOCIETY:

I. Annual Address, by Chief-Justice DALY, the President. Subject — The Geographical Work of the World in 1872. Delivered February 17th, 1873 63

II. Annual Address, by DANIEL C. GILMAN, President of the University of California, at Oakland. Subject — Geographical Work in the United States during 1871. Delivered January 30th, 1872 119

III. The History and Authority of the Verrazano Map, with a reduced copy of the same, by J. CARSON BREVOORT. Read November 28th, 1871 145

IV. Physical Geography of the North-western Boundary of the United States, with twelve illustrations, by GEORGE GIBBS. Read November 11th, 1869. Continued 398

V. North-western North America: Its Resources and Its Inhabitants. By J. T. ROTHROCK, M. D. Read December 17th, 1873 398

VI. On the Paleogeography of North America, by Prof. T. STERRY HUNT, LL. D., F. R. S. Read November 12th, 1872 416

VII. On Martin Behaim's Globe and his Influence upon Geographical Science, by Rev. MYTTON MAURY. Read March 19th, 1872 ... 432

VIII. Report of the Reception tendered by the American Geographical Society to HENRY M. STANLEY, Esq., on the evening of November 26th, 1872 453

ANNUAL REPORT

OF THE

AMERICAN GEOGRAPHICAL SOCIETY.

To the Honorable the Legislature of the State of New York:

The undersigned beg leave to present this their second annual report, for the year 1872, in accordance with the provisions of the act of April 8, 1871. It contains the list of officers of the present year, the Society's receipts, expenditures and financial condition up to the present time; the annual report of its Council, the reports of its various officers, the state of its library, and the papers read before it, which embrace a large amount of new and valuable geographical and statistical information, especially in relation to our own country.

Respectfully submitted.

CHAS. P. DALY, *President.*
F. A. CONKLING,
Chairman of the Council.
HENRY CLEWS, *Treasurer.*
DR. E. R. STRAZNICKY,
Recording Secretary.

CHARTER OF INCORPORATION.

GRANTED APRIL 13TH, 1854.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. George Bancroft, Henry Grinnell, Francis L. Hawks, John C. Zimmerman, Archibald Russell, Joshua Leavitt, William C. H. Waddell, Ridley Watts, S. De Witt Bloodgood, M. Dudley Bean, Hiram Barney, Alexander J. Cotheal, Luther B. Wyman, John Jay, J. Calvin Smith, Henry V. Poor, Cambridge Livingston, Edmund Blunt, Alexander W. Bradford, and their associates, who are now or may become hereafter associated for the purposes of this act, are hereby constituted a body corporate by the name of The American Geographical and Statistical Society, for the purpose of collecting and diffusing geographical and statistical information.

§ 2. For the purposes aforesaid, the said Society shall possess the general powers and privileges, and be subject to the general liabilities, contained in the third title of the eighteenth chapter of the first part of the Revised Statutes, so far as the same may be applicable, and may not have been modified or repealed; but the real and personal estate which the said Society shall be authorized to take, hold and convey, over and above its library, and maps, charts, instruments and collections, shall not at any time exceed an amount, the clear yearly income of which shall be ten thousand dollars.

§ 3. The officers of the said Society shall be a president, three vice-presidents, a corresponding secretary, a recording secretary, a librarian, and treasurer, and

such other officers as may from time to time be provided for by the by-laws of the said Society.

§ 4. The said Society, for fixing the terms of admission of its members, for the government of the same, for changing and altering the officers above named, and for the general regulation and management of its transactions and affairs, shall have power to form a code of by-laws not inconsistent with the laws of this State or of the United States; which code, when formed and adopted at a regular meeting, shall, until modified or rescinded, be equally binding as this act upon the said Society, its officers and its members.

§ 5. The Legislature may at any time alter or repeal this act.

§ 6. This act to take effect immediately.

STATE OF NEW YORK,
Secretary's Office.

I have compared the preceding with the original law on file in this office, and hereby certify the same to be a correct transcript therefrom and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, [L. S.] this thirteenth day of April, one thousand eight hundred and fifty-four.

A. G. JOHNSTON,
Deputy Secretary of State.

AMENDED CHARTER.

PASSED APRIL 8TH, 1871.

STATE OF NEW YORK, NO. 237, IN SENATE, *March* 7, 1871.—Introduced by unanimous consent by Mr. Bradley; read twice and referred to the Committee on Literature; reported favorably from said committee, and committed to the Committee of the Whole.

CHAP. 373.

AN ACT in relation to The American Geographical and Statistical Society. Passed April 8th, 1871.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. The name or corporate title of the said Society shall hereafter be, "The American Geographical Society of New York."

§ 2. The objects of the said Society shall be the advancement of geographical science; the collection, classification and scientific arrangement of statistics, and their results; the encouragement of explorations for the more thorough knowledge of all parts of the North American continent, and of other parts of the world which may be imperfectly known; the collection and diffusion of geographical, statistical and scientific knowledge by lectures, printed publications, or other means; the keeping up of a correspondence with scientific and learned societies in every part of the world, for the collection and diffusion of information, and the interchange of books, charts, maps, public reports, documents and valuable publications; the permanent establishment in the city of

New York of an institution in which shall be collected, classified and arranged, geographical and scientific works, voyages and travels, maps, charts, globes, instruments, documents, manuscripts, prints, engravings, or whatever else may be useful or necessary for supplying full, accurate and reliable information in respect to every part of the globe, or explanatory of its geography, physical and descriptive; and its geological history, giving its climatology, its productions, animal, vegetable and mineral; its exploration, navigation, and commerce; having especial reference to that kind of information which should be collected, preserved, and be at all times accessible for public uses in a great maritime and commercial city.

§ 3. The power given by the act hereby accorded to the said Society, to take, hold, convey, manage, and make use of its real and personal estate, shall be understood as authorizing said Society to take and hold by gift, grant, bequest, devise, subject to all provisions of law relative to devises and bequests by last will and testament, or purchase real estate to the value of three hundred thousand dollars, and to invest its income or its personal estate generally so as to produce a regular annual income sufficient for the accomplishment of the purposes set forth in the first section of this act; but said annual income shall not exceed twenty-five thousand dollars annually.

§ 4. The said Society shall make an annual report of its proceedings to the Legislature.

State of New York, }
Office of Secretary of State, } ss.

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, [L. S.] this twenty-second day of May, in the year one thousand eight hundred and seventy-one

DIEDRICH WILLERS, Jr.,
Deputy Secretary of State.

BY-LAWS.

REVISED DECEMBER 9TH, 1869.

CHAPTER I.

TITLE.

The title of the Society is, "The American Geographical and Statistical Society." *

CHAPTER II.

OBJECTS.

The objects of the Society are, "the collecting and diffusing of geographical and statistical information."

CHAPTER III.

MEMBERS.

The Society shall consist of resident, non-resident, honorary, corresponding and *ex-officio* members.

1. Resident members are those residing in the city of New York, or its vicinity.

2. Non-resident members are those residing at least twenty-five miles distant from the city.

3. Honorary members shall be chosen on account of their distinction in the science of geography or statistics, and not more than twelve of them shall hereafter be elected in any one year.

4. Corresponding members shall be chosen from those who have aided the advancement of geography or statistics.

5. *Ex-officio* members shall be foreign diplomatic representatives and consuls resident in the United States, and

* Changed by act of April 8, 1871.

United States diplomatic representatives and consuls in foreign countries.

6. Resident, non-resident, corresponding, and honorary members shall be elected as follows: All nominations of candidates shall be openly made in writing at a meeting of the Society, or the Council, by a member thereof, and, together with the name of the member making them, entered on the minutes. The persons thus nominated, when approved by the Council and elected by the Society, shall, on payment of the initiation fee, if nominated as a resident or non-resident member, and without such payment if nominated as a corresponding or honorary member, become members of the Society accordingly.

7. Persons entitled to become *ex-officio* members of the Society shall, on the recommendation of the Council, be by the Society constituted and declared to be such members.

8. The name of any member of the Society may, on the recommendation of the Council, and by a vote of two-thirds of the members present at a stated meeting of the Society, be dropped from the roll of its members.

CHAPTER IV.

INITIATION FEE AND ANNUAL DUES.

1. The initiation fee, including the dues for the current year, shall be, for a resident member, ten dollars; and for a non-resident member, five dollars; in both cases to be paid immediately on election.

2. The annual dues thereafter shall be, for a resident member, five dollars; and for a non-resident member, two dollars and a half; both to be paid in advance.

3. Any member of the Society, not in arrears, may commute for life all dues for membership, by the payment at one time, if a resident member, of fifty dollars; and, if a non-resident member, twenty-five dollars.

4. The name of any resident or non-resident member of the Society, neglecting for two successive years to pay

his annual dues, or at any time wholly refusing to pay them, may, by the Council, be erased from the list of members of the Society.

5. The fiscal year of the Society shall, for all purposes, be the calendar year, that is, commence on the first day of January, and end with the thirty-first day of December, in each year.

CHAPTER V.

OFFICERS.

1. The officers of the Society shall be a president, three vice-presidents, a foreign corresponding secretary, a domestic corresponding secretary, a recording secretary, a treasurer and nine councillors; and these officers together shall form the Council of the Society.

2. The officers of the Society shall be chosen from among its members; they shall be elected annually by ballot, and shall hold their offices respectively until others are elected in their places.

3. All officers of the Society, to be chosen at any election, may be voted for on one ballot.

CHAPTER VI.

ANNUAL MEETING.

1. The annual meeting of the Society shall be held on the second Tuesday after the first day of January in each and every year hereafter, when the annual election of the officers of the Society shall take place; and if, from any cause, there shall be a failure of the annual election at the time above designated for that purpose, the same may be held on the Tuesday next following,—that is, on the third Tuesday after the first day of January in each year, and of which due notice shall be given.

2. Every member of the Society who has been such for twenty days or more, and who is not in arrears for his dues for the past year, shall be entitled to vote at the said election.

3. At the annual meeting of the Society, the Council shall present a general report of its proceedings, and of those of the Society during the past year, and the secretaries and treasurer shall also present their annual reports.

CHAPTER VII.

MONTHLY AND SPECIAL MEETINGS.

1. The Society, unless otherwise specially ordered by the Society or the Council, shall hold its stated meetings for the transaction of business on the second Tuesday of each month of the year, except July, August and September.

2. The president, or, in his absence, one of the vice-presidents, may, and, upon the written request of five members, shall, call a special meeting of the Society, by giving three days' notice thereof in two daily newspapers published in the city of New York.

CHAPTER VIII.

ORDER OF BUSINESS.

1. At all stated meetings of the Society, for the transaction of ordinary business, the order of proceedings shall be as follows:

1. Reading of the minutes.
2. Reports and communications from officers of the Society.
3. Reports from the Council.
4. Reports from committees.
5. Nominations of members.
6. Special orders.
7. Unfinished business.
8. Miscellaneous business.
9. Papers read and addresses delivered before the Society.

2. All propositions presented for the action of the Society, at any of its meetings, shall be in writing, when requested by the presiding officer or any member. A

proposition thus presented, when seconded, and the question thereon stated from the chair, shall be deemed to be in the possession of the Society, and open for discussion; but may be withdrawn by the mover at any time before amendment or decision.

3. No member shall speak more than once upon the same question until all the other members present, desiring to speak, shall have spoken; nor more than twice on any question without leave of the Society.

CHAPTER IX.

QUORUM.

At all meetings of the Society, nine members present shall constitute a quorum for the transaction of business.

CHAPTER X.

COMMITTEES.

All Committees authorized by the Society shall, unless otherwise specially ordered, consist of three members each, and be appointed by the presiding officer.

CHAPTER XI.

PRESIDING OFFICER.

At all meetings of the Society, on the arrival of the appointed hour and the presence of a quorum, the president, or, in his absence, one of the vice-presidents, or, in the absence of both, a chairman *pro tem.*, shall immediately take the chair, call the meeting to order, and preside. He shall have only a casting vote. He shall preserve order and decide all questions of order, subject to an appeal to the Society. He shall also, unless otherwise specially ordered, appoint all committees authorized by the Society; and at every annual election, before the opening of the polls, he shall appoint two tellers of the election.

CHAPTER XII.

SECRETARIES.

1. Foreign Corresponding Secretary.—It shall be the duty of the foreign corresponding secretary to conduct the general correspondence of the Society with individuals and associate bodies in foreign countries.

2. Domestic Corresponding Secretary.—It shall be the duty of the domestic corresponding secretary to conduct the Society's general correspondence with individuals and associate bodies in the United States.

3. Both the foreign and domestic secretaries shall keep, in suitable books to be provided for that purpose at the Society's rooms, true copies of all letters written by them respectively on behalf of the Society; and shall preserve on proper files, at the said rooms, all letters received by them on the same account; and at each stated meeting of the Society or the Council they shall respectively report their correspondence and read the same, or such parts thereof as may be required.

4. In case of a vacancy in the office of either of the corresponding secretaries, or in the absence or disability of either of these officers, the duties of both may be performed by the other corresponding secretary.

5. The Society may designate a particular officer, or appoint a committee to prepare a letter or letters on any special occasion.

6. Recording Secretary. It shall be the duty of the recording secretary to give due notice of the time and place of all meetings of the Society, and to attend the same. He shall keep fair and accurate minutes of the proceedings of the Society, and record the same, when approved, in the Society's Journal. He shall give immediate notice to the several officers and committees of the Society, of all votes, orders, resolves, and proceedings of the Society affecting them, or appertaining to their respective duties. He shall prepare a list of the members

of the Society entitled to vote, to be handed to the tellers before the opening of the polls at each annual election. He shall officially sign and affix the corporate seal of the Society to all diplomas, and other instruments or documents authorized by the Society or Council. He shall have charge of the corporate seal, charter, by-laws, records and general archives of the Society, except so far as they may be expressly placed under the charge of others. He shall certify all acts and proceedings of the Society, and shall notify the Council of the death, resignation or removal of any officer or member of the Society. He shall have charge of the rooms of the Society, and shall perform all such other and further duties as may, from time to time, be devolved upon him by the Society or the Council. He shall receive for his services such salary or pecuniary compensation as shall be determined by the Society or the Council; but neither in the Society nor the Council shall he have a vote on any question relating to or affecting his salary or pecuniary compensation. He, together with the Council, shall have the charge and arrangement of the books, maps, and collections belonging to the Society. He shall cause to be kept in the rooms of the Society a registry of all donations to the library or collections of the Society, acknowledge their receipt by letter to the donors, and report the same, in writing, to the Society at its next stated meeting.

7. All documents relating to the Society, and under the charge of the secretaries respectively, shall be placed in such depositories in the rooms of the Society as the Council may provide and designate for that purpose.

CHAPTER XIII.

TREASURER.

The treasurer shall have charge of and safely keep all contracts, certificates of stock, securities, and muniments of title belonging to the Society. He shall collect the dues and keep the funds of the Society, and disburse the

same under the direction of the Council; and so often as the said funds in the hands of the treasurer shall amount to one hundred dollars, he shall deposit the same, in the name of the Society, in some incorporated bank in the city of New York, to be designated for that purpose by the Council; and the said funds, thus deposited, shall be drawn out of the said bank on the check of the treasurer, countersigned by the chairman of the Council, and only for the legitimate and authorized purposes of the Society. The treasurer shall, previous to the annual meeting of the Society, prepare and submit to the Council, for audit, a detailed account of his receipts and disbursements for account of the Society during the past year; and which annual account, duly audited, he shall present, with his general report, to the Society, at its annual meeting.

CHAPTER XIV.

COUNCIL.

1. The Council shall have the management and control of the affairs, property, and funds of the Society; and shall designate an incorporated bank in the city of New York, where the said funds shall, from time to time as they accrue, be deposited by the treasurer.

2. It may frame its own by-laws not inconsistent with the charter or by-laws of the Society.

3. It may, from time to time, determine the salary or pecuniary compensation of the recording secretary; and shall also appoint the necessary agents, clerks, and servants of the Society, with such powers, duties, privileges, and compensation as it may from time to time determine, and may at pleasure revoke such appointments, and make others in their stead.

4. It shall have power to fill, for the unexpired term, any vacancy that may occur in any of the offices of the Society.

5. It shall have power, at its discretion, to declare vacant the seat of any member of its own body (except

the president and vice-presidents) who shall have been absent from its meetings for three successive months; and also, by a vote of a majority of the whole Council, to remove from its own body any member thereof for cause; but in such case it shall be the duty of the Council to report every such vacancy or removal to the Society at its next stated meeting thereafter, when such cases shall be subject to review by the Society.

6. It shall not, without an approving vote of the Society at a stated meeting thereof, make any contract whereby a liability in amount above one thousand dollars may be incurred by the Society, nor, without such vote, make any sale or disposition of the property of the Society exceeding that sum in value.

7. The Council may, in its discretion, remit the initiation fee or annual dues of any member of the Society.

8. No member of the Council, except the recording secretary, shall receive any salary or pecuniary compensation for his services.

9. The Council shall hold stated meetings for the transaction of business, at least once in every month, except the months of July, August, and September.

10. At all meetings of the Council, five members present shall constitute a quorum for the transaction of business.

CHAPTER XV.

GENERAL PROVISION AS TO DEBT.

No debt on account of the Society, beyond the funds in the treasury for its payment, shall, for any purpose, at any time be incurred; and if at any time it shall appear that there are resting upon the Society pecuniary obligations beyond the funds in the treasury for their liquidation, no appropriation of funds from the treasury whatever, except for the necessary current expenses of the Society, shall be made until the said pecuniary obligations shall be fully discharged, or the funds necessary

for their extinction shall have been set apart for that purpose.

CHAPTER XVI.

ALTERATION OF THE BY-LAWS.

No alteration in the by-laws of the Society shall be made unless openly proposed at a stated meeting of the Society, entered on the minutes, with the name of the member proposing the same, and adopted by the Society at a subsequent stated meeting, by a vote of two-thirds of the members present.

CHAPTER XVII.

ADOPTION OF THE BY-LAWS.

The foregoing are hereby adopted and declared to be the by-laws of the Society; and all by-laws of the Society heretofore adopted are hereby rescinded, and declared to be null and void.

HONORARY, CORRESPONDING, AND RESIDENT MEMBERS.

HONORARY MEMBERS.

His Imperial Highness the Grand Duke Constantine of Russia, President of the Imperial Geographical Society, St. Petersburg, Russia.

FREMONT, John Chas., LL. D., New York.

GRINNELL, Henry, New York.

LAYARD, Austin Henry, D. C. L., London, England.

LIVINGSTONE, David, D. D., LL. D.

MCCLINTOCK, Francis Leopold, LL. D., London, England.

MIDDENDORFF, Adolph Theo. von, Secretary of the Imperial Academy of Sciences of Russia, St. Petersburg.

PETERMANN, Prof. Augustus, Ph. D., Gotha, Germany.

QUETELET, Lambert Adolphe Jacques, President of the Central Commission of Statistics of Belgium, Brussels.

RAWLINSON, Sir Henry Creswicke, D. C. L., President Royal Geographical Society, London, England.

STRUVE, Otto Wilhelm von, St. Petersburg, Russia.

CORRESPONDING MEMBERS.

ABBE, Prof., Cleveland, Cincinnati Observatory, Ohio.

ALEXANDER, John Henry, Baltimore, Md.

ALTAMIRANO, Señor Don Ignacio, Mexico.

ALVORD, Benjamin, U. S. A., Fort Vancouver, Washington Territory.

ARCHBALD, Andrew B., Paris, France.

BARANDA, Señor Joaquin, Gov. of Campeche, Mexico.

BARCLAY, James T., M. D., Jerusalem, Syria.

BARNARD, Henry, LL. D., Hartford, Conn.

BARTLETT, John Russell, Providence, R. I.

BASTIAN, A., M. D., President Geographical Society, Berlin.

BAZ, Señor Don Juan José, Governor of the District of Mexico.

BECKER, M. A., General Secretary Imperial Geographical Society, Vienna.

BEHM, Dr. E., Gotha.

BRADLEY, Rev. Daniel B., Siam.

BRIGHT, John, M. P., London, Engla'd.

BUSHNELL, Rev. Albert, Gaboon, Equatorial Africa.

CARLOS, Señor Don José, Washington, D. C.

Chaix, Prof. Paul, Geneva, Switzerland.

Chambers, Hon. Wm., Edinburgh, Scotland.

Chandless, W., F. R. G. S., London, England.

Cierol, Señor Manuel, Governor of Yucatan, Mexico.

Cologeras, Hon. J. B., Rio Janeiro, Brazil.

Cook, Charles W., San Francisco, California.

Davis, Thomas E., Rome, Italy.

Delaplaine, Geo. P., Madison, Wis.

Dixon, Hon. James, Hartford, Conn.

Draper, Lyman, Madison, Wis.

Duer, John K., Lieut. U. S. N., Washington, D. C.

Duncan, William H., Hanover, N.H.

Emory, Wm. H., U. S. A., Washington, D. C.

Foetterle, Franz, late Secretary of the Imperial Royal Geographical Society of Vienna, Austria.

Gardner, J. T., Commissioner, Washington, D. C.

Gilman, Daniel Coit, LL. D., President University of California, Oakland.

Green, Thomas J., Washington, D.C.

Gulick, Luther Halsey, M. D., Micronesian Islands.

Guyot, Prof. Arnold Henry, LL. D., Princeton, N. J.

Hague, J. D., U. S. Commissioner, Washington, D. C.

Hancock, William Neilson, LL. D., Secretary Geographical and Statistical Society, Dublin.

Hayden, Prof. F. V., U. S. Geological Survey of the Territories.

Hellwald, Friedrich von, Member of the Imperial Royal Geographical Society, Vienna, Austria.

Hepburn, Jas. Curtis, M. D., Siam.

Hines, Wm. E., U. S. Consul, Zanzibar, Africa.

Hitchcock, Prof. C. H., Ph. D., Hanover, N. H.

Hochstetter, Dr. Ferdinand von Professor in the University of Vienna, Austria.

Hough, Franklin B., M. D., Albany, N. Y.

Humphreys, Brig.-Gen. A. A., U. S. A., Chief of Engineers, Washington, D. C.

Hunt, Prof. T. Sterry, LL. D., Boston, Mass.

Jameson, Wm., M. D., Quito.

Julian, Alexis A., Island of Sombrero, W. I.

Kennedy, Jos. Camp. Griffith, late Superintendent of the U. S. Census, Washington, D. C.

King, Clarence, Commissioner, Washington, D. C.

Lachlan, R., Cincinnati, Ohio.

Lamansky, Eugen von, Imperial Russian Geographical Society, St. Petersburg, Russia.

Lapham, Increase A., Milwaukee, Wis.

Leavenworth, Elias W., Syracuse, N. Y.

Lesseps, Ferdinand de, Suez, Egypt.

Long, Stephen H., Colonel U. S. A., Louisville, Ky.

Lyon, Hon. Caleb, Idaho.

McCartee, Divie Bethune, M. D., Hong Kong, China.

McClelland, Robert, Wash., D. C.

Maclay, Wm. W., U. S. N., Annapolis, Md.

Malte Brun, V. A., Honorary Secretary of the Geographical Society, Paris, France.

Mansfield, Edward D., Commissioner of Statistics of Ohio, Columbus.

MARISCAL, Señor Don Ignacio, of Mexico, Washington, D. C.

MARSH, Hon. George P., LL. D., U. S. Minister, Florence, Italy.

MARTIN, R. Montgomery, F. R. G. S., London, England.

MARTIN, Rev. Wm. A. P., D. D., Professor of the Imperial College at Pekin, China.

MASON, Charles, Washington, D. C.

MAUNOIR, Charles, General Secretary Geographical Society, Paris.

MAURY, Louis Ferdinand Alfred, Geographical Society, Paris, France.

NAPRSTEK, Vojta, Prague, Austria.

NEGRI, Cristoforo, President Italian Geographical Society, and Chief of the Consular Bureau, Foreign Office, Florence, Italy.

NEWMARCH, Wm., Hon. Secretary of the Statistical Society of London, England.

NORDENSKJÖLD, Prof. A. E., Stockholm, Sweden.

NORMAN, Benj. M., New Orleans, La.

NYE, Gideon, U. S. Consul, Canton, China.

OLIVIERA, B. de, Rio Janeiro, Brazil.

OLRIK, C. S. M., Royal Danish Inspector at Godhavn, N. Greenland.

PALAZIOS, Gen. Vicente Riva, Mexico.

PALMER, Aaron H., Washington, D. C.

PARDO, Señor Don Emílio, Mexico.

PAYNO, Señor Don Manuel, Vice-President Geographical and Statistical Society, Mexico.

PEIRCE, Prof. Benj., Ass't Secretary Smithsonian Institution, Washington, D. C.

PENNA, Señor Terreira, Para, Brazil.

PERKINS, E. H., U. S. Consul, St. Croix, W. I.

PIMENTEL, Dr. Joaquin Xavier de Oliveira, Santarem Para, Brazil.

PINHEIRO, J. C. Fernandes, M. D., Brazil.

PORSCHE, Theo., Washington, D. C.

RAE, John, M. D., F. R. G. S., London, England.

RIO DE LA LOZA, Señor Don Leopoldo, President Geographical and Statistical Society, Mexico.

ROBERTS, Gen. W. Milnor, Chief Engineer Northern Pacific Railroad.

RODGERS, John, Rear-Admiral U.S. N.

ROMERO, Hon. Mathias, Minister of Finance of Mexico.

ROTHROCK, Dr. J. T., Wilkesbarre, Pa.

SAINT-MARTIN, Vivien de, Vice-President Geographical Society, Paris.

SAPUCACHY, M. le Viscomte, Rio Janeiro, Brazil.

SCHADE, M. D., Louis, Washington, D. C.

SCHLAGINTWEIT-SAKÜNLÜNSKI, Prof. Herman von, Munich.

SCHLAGINTWEIT-SAKÜNLÜNSKI, Prof. Robert von.

SEWARD, Hon. Wm. H., LL. D., Auburn, N. Y.

SEYMOUR, Hon. Horatio, LL. D., Utica, N. Y.

SHANKLAND, Thomas, U. S. Consul, Island of Mauritius.

SIMMONS, D. B., M. D., Yeddo, Japan.

SMITH, Edward R., Washington, D. C.

STEVENS, Henry, F. R. S., London, England.

TEJADA, Don Sebastian Lerdo de, Mexico.

VAN BUREN, General Thomas B., U. S. Commissioner-General, Vienna Exposition, New York.

WARNE, Joseph, Oxford, England.

WHEELER, G. M., Lieut. U. S. Corps of Engineers, Washington, D. C.

RESIDENT AND NON-RESIDENT MEMBERS, UP TO NOVEMBER 1st, 1873.

N. B.—*Those having L. M. preceding their names have compounded for life.*

Year of Election			
1870			Abbe, George W., 8 Pine street.
1860			Acton, Thomas C., 32 Wall street.
1860			Adams, Rev. C. C. Manhattanville, N. Y.
1869			Aguiar, A. W. F. de, 13 Broadway.
1872			Alburtis, Edward K., 427 W. Twenty-first street.
1872			Allen, Horatio M., 59 Wall street.
1869			Allen, Jerome, 3 East Thirty-third street.
1853			Alsop, Joseph W., 32 Washington square W.
1868			Appleton, William H., 549 Broadway.
1859	10	L. M.	Arnold, Daniel H., 425 West Twenty-third street.
1859			Arnoux, William H., 271 Broadway.
1870			Asher, John R., 114 East Twenty-third street.
1856			Aspinwall, William H., 33 University place.
1871			Atterbury, Rev. Wm. Wallace, Bible House.
1869			Auchmuty, Richard Tylden, 61 University place.
1859		L. M.	Aymar, William, 37 West Twentieth street.
1869			Badeau, Gen. Adam.
1869			Bailey, James Muhlenberg, 11 West Twenty-eighth street.
1873			Bailey, N. P., 11 West Twenty-eighth street.
1856	20		Baker, Francis, 69 Worth street.
1856			Ball, Henry, 565 Broadway.
1852		L. M.	Bancroft, Hon. Geo., U. S. Ambassador, Berlin, Germany.
1868			Banks, David, Jr., 144 Nassau street.
1865			Banvard, John, Flushing, L. I.
1869			Banyer, Goldsboro, 13 West Twenty-first street.
1873			Barbour, Chief Justice, John M., 22 West Forty-fifth street.
1868			Barlow, Gen. Francis C., 21 Park row.
1859			Barlow, S. L. M., 35 William street.
1858			Barney, Danford N., 82 Broadway.
1852	30	L. M.	Barney, Hiram, 111 Broadway.
1868			Barrett, William C., 20 Nassau street.
1869			Barrow, John W., 350 Broadway.
1868			Beardslee, Rufus G., 106 Broadway.
1868			Beckwith, N. M., 253 Fifth avenue.
1868			Beebe, Hon. Welcome R., 68 Wall street.
1857			Beekman, James W., 5 East Thirty-fourth street.
1870			Bell, George, 20 West Twentieth street.
1865			Bellows, D. D., Rev. Henry W., 232 East Fifteenth street.
1859		L. M.	Belmont, August, 50 Wall street.

Year of Election.			
1868	40		Benedict, Erastus C., 64 Wall street.
1868			Bennett, James Gordon, 425 Fifth avenue.
1870			Bergh, Henry, 429 Fifth avenue.
1868			Bernheimer, Adolph, 101 Franklin street.
1859			Bernheimer, Isaac, 320 Broadway.
1868			Bernheimer, Leopold, 145 West Forty-second street.
1868			Bernheimer, Simon, 218 West Fourteenth street.
1856			Berry, Richard, 291 Broadway.
1869			Bickmore, Prof. Albert S., M. A., Museum, Central Park.
1869			Bierstadt, Albert, 51 West Tenth street.
1868	50		Bill, Edward.
1870		L. M.	Bishop, T. Alston, 65 Fifth avenue.
1871			Bixby, John M., 461 Fifth avenue.
1856			Black, William, 565 Broadway.
1868			Blake, Charles F., 19 Park place.
1868			Bleecker, T. B., Jr., 61 William street.
1872			Blodgett, Daniel C., 61 Fifth avenue.
1860			Blodgett, William T., 252 Pearl street.
1869			Bloomfield, William, 132 Nassau street.
1859			Boardman, Andrew, 322 Broadway.
1870	60		Body, John E., 1 State street.
1871			Bolton, Henry C., Ph. D., 59 West Fifty-first street.
1859			Boorman, J. M., Cliff House, Tarrytown, N. Y.
1857			Booth, Wm. A., 100 Wall street.
1856			Booth, Wm. T., 100 Wall street.
1870			Botta, Vincenzo, 25 West Thirty-seventh street.
1869			Bradford, William, 51 West Tenth street.
1868			Brady, Hon. John R., 19 West Thirty-third street.
1856			Brevoort, J. Carson, Brooklyn, N. Y.
1872			Bridgham, S. W., 49 West Twenty-third street.
1862	70		Bristed, C. Astor.
1870			Brooks, Sidney, Newport, R. I.
1866			Brown, Ebenezer H., 121 Nassau street.
1859		L. M.	Brown, James, 59 Wall street.
1853			Brown, James M., 59 Wall street.
1856			Brown, Stewart, 59 Wall street.
1872			Brown, Walston H., 59 Liberty street.
1872		L. M.	Bryce, James, 119 East Eighteenth street.
1869			Burdett, Charles P., 174 Water street.
1871			Butler, Benj. F., 45 Exchange place.
1853	80		Butler, Charles, 12 Wall street.
1870			Butler, Cyrus, 24 Cliff street.
1861			Butterfield, Gen. Daniel.
1868			Carter, James C., 66 Wall street.

Year of Election.			
1856			Carter, Robert, 530 Broadway.
1861			Cary, Lucius E., 90 Pine street.
1863		L. M.	Cary, William F., 90 Pine street.
1873			Casey, Joseph J., 2 Irving place.
1870			Casserly, Bernard, Manhattan Club.
1868		L. M.	Catlin, N. W. Stuyvesant, 45 William street.
1859	90		Chapin, Rev. E. H., D. D., 44 East Thirty-third street.
1868			Chapman, Jos. H., 51 Wall street.
1871			Charlick, Oliver, 254 West Thirty-fourth street.
1868			Choate, William G., 49 Wall street.
1869			Churchill, Franklin H., 33 Pine street.
1868			Cisco, John J., 59 Wall street.
1872			Clark, E. V., Century Club.
1859			Clift, Smith, 15 West Twenty-ninth street.
1864			Clews, Henry, 32 Wall street.
1856			Colegate, Charles C., 55 John street.
1852	100	L. M.	Colton, Joseph H., 73 Beekman street.
1869			Conger, Hon. Abraham B., 132 Nassau street.
1870			Conger, Clarence R., 19 West Twentieth street.
1872			Conklin, Eugene E., 432 Canal street.
1870			Conklin, William A., Museum, Central Park, N. Y.
1855		L. M.	Conklin, Hon. F. A., 170 Broadway.
1856		L. M.	Cooley, James E., 78 Fifth avenue.
1856			Cooper, Edward, 17 Burling slip.
1855			Cooper, Peter, 17 Burling slip.
1872			Corse, Israel, 104 Fifth avenue.
1868	110		Coulter, Samuel, 83 Chambers street.
1862			Cowdin, Hon. Elliot C., 98 Grand street.
1871			Cox, James F., 52 William street.
1872			Cox, Hon. Samuel S., 13 East Twelfth street.
1872			Crain, Dunham Jones, 81 Irving place.
1872			Crawford, S. W., Maj.-Gen. U. S. A., Chambersburg, Pa.
1856			Crooks, Ramsey, 57 Front street.
1870			Cruickshank, Jas., LL. D., 164 S. Oxford st., Brooklyn, N.Y.
1869		L. M.	Cullum, Geo. W., Maj.-Gen. U. S. A., corner Greene and Houston streets.
1858			Currie, Gilbert E., 153 Broadway.
1856	120		Curtis, Lewis, 40 University place.
1856			Curtis, Hon. William E., 209 East Fifteenth street.
1855			Daly, Chief Justice Charles P., LL. D., 84 Clinton place
1871			Daly, Hon. Joseph F., 214 West Twenty-fifth street.
1866			Darling, William A., 69 West Forty-fourth street.
1870			Dash, John B., 47 East Nineteenth street.
1868			Davies, Hon. Henry E., 120 Broadway.
1870			Davis, Alex. J., 34 Waverley place.

Year of Election.			
1870			Davison, Edward F., 128 Pearl street.
1868			Dawson, H. B., Morrisania, N. Y.
1868	130		De Costa, Rev. B. F., 42 East Nineteenth street.
1873			Delano, Franklin H., 35 Broadway.
1867		L. M.	Dennis, Charles, 51 Wall street.
1873		L. M.	De Peyster, Frederick, 67 University place.
1864			Detmold, Christian E., 111 Broadway.
1856			Detmold, William, M. D., 38 East Ninth street.
1868			De Voe, Col. Thomas F., 104 West Thirteenth street.
1859			Dickerson, E. N., 62 East Thirty-fourth street.
1864			Diehl, Israel S., 58 Reade street.
1870			Dinsmore, Wm. B., 59 Broadway.
1869	140		Dodge, Robert, 12 Wall street.
1856			Dodge, Hon. William E., 13 Cliff street.
1856			Dodge, William E., Jr., 13 Cliff street.
1856			Doremus, R. Ogden, M. D., 227 Fourth avenue.
1856			Douglas, Andrew E., 89 Wall street.
1868			Draper, Henry, M. D., 271 Madison avenue.
1873			Drone, Eaton S., 307 East Eighteenth street.
1870			Drowne, Henry T., 52 Wall street.
1868			Du Chaillu, Paul B., 43 East Thirtieth street.
1856			Duncan, Wm. Butler, 11 Nassau street.
1855	150		Dunshee, Henry W., 142 West Tenth street.
1870			Durant, Thomas C., M. D., 20 Nassau street.
1868			Duyckinck, Evert A., 20 Clinton place.
1868			Dwight, Prof. Theo. W., LL. D., 43 Lafayette place.
1868			Edmonds, Hon. J. W., 271 Broadway.
1872			Edwards, Jonathan, 204 West Thirty-eighth street.
1873			Ellinger, Moritz, 11 Ann street.
1852			Elliott, S. M., M. D., 32 Waverley place.
1856			Elsworth, Henry, 223 West Fourteenth street.
1868			Emmet, Thomas Addis, M. D., 91 Madison avenue.
1869	160		Emott, Hon. James, 20 Nassau street.
1864			Evans, Walton W., 47 Exchange place.
1859			Evarts, Hon. Wm. M., 52 Wall street.
1853			Eyre, Henry S. P., 174 Pearl street.
1864			Faile, Thomas H., 130 Water street.
1856			Fernbach, Henry, 346 Broadway.
1856		L. M.	Field, B. H., 127 Water street.
1854		L. M.	Field, Cyrus W., Gramercy place.
1856			Field, David Dudley, 4 Pine street.
1869			Field, Dudley, 4 Pine street.
1860	170		Field, Rev. H. M., 5 Beekman street.

Year of Election.			
1852		L. M.	Field, Hickson W., Europe.
1857			Fish, Hon. Hamilton, 104 East Tenth street.
1871			Fliess, William M., 47 Broadway.
1859		L. M.	Fogg, William H., 32 Burling slip.
1872			Foote, Horace A., 99 Water street.
1869			Forsyth, Rev. John, D. D., West Point, N. Y.
1859			Fowler, Edward P., M. D., 2 East Thirty-third street.
1873			Friedmann, Hon. John J., 119 West One Hundred and Twenty-fifth street.
1868			Frohwein, Theobald, 218 Stanton street.
1871	180		Fry, Horace B., 12 Wall street.
1869			Furniss, William, New York, P. O. box 560.
1853			Gaillard, Joseph, 34 South street.
1868			Gambrill, C. D., 57 Broadway.
1869			Ganse, Rev. H. D., D. D., 155 East Sixty-first street.
1868			Gardner, A. K., M. D., 237 East Thirteenth street.
1873			Garvin, Hon. Sam'l B., 58 West Thirty-eighth street.
1873			Gavit, John E., 142 Broadway.
1868		L. M.	Gebhard, William H., Union Club, Fifth avenue.
1869			Gerard, James W., 17 Gramercy Park.
1872	190		Gerard, James W., Jr., 45 William street.
1868		L. M.	Gerry, Elbridge T., 164 Nassau street.
1856			Gescheidt, Louis A., M. D., Hastings-on-Hudson, N. Y.
1872			Gibbs, George, Newport, R. I.
1869			Gilbert, Clinton, 73 Sixth avenue.
1868			Gillies, James W., 237 Washington street.
1871			Gilman, William C., 46 Pine street.
1873			Gilmore, Maj.-Gen'l Quincy A., U. S. A., Army building, corner Greene and Houston streets.
1870			Godon, Rear-Admiral Sylvanus W., U. S. N., in Europe.
1870			Goldman, Marcus, 4 West Forty-seventh street.
1868	200		Goldsmith, Jacob, 320 Broadway.
1872			Goulding, B. L., 347 Fourth avenue.
1870			Graham, Gen. C. K., 119 Broadway.
1860		L. M.	Graham, James L., Jr., 108 Broadway.
1859			Graham, R. M. C., 108 Broadway.
1868			Green, Andrew H., Fifth avenue.
1852		L. M.	Green, John C., 71 South street.
1868			Greene, Gen. G. S., 29 West Thirty-second street.
1857		L. M.	Greene, John W., M. D.
1856			Greenwood, Isaac J., 214 West Fourteenth street.
1852	210		Grinnell, Henry, 45 William street.
1853			Grinnell, Moses H., 20 Union square.
1872			Grinnell, Robert M., 17 Bond street.

Year of Election.			
1859		L. M.	Griswold, George, 72 South street.
1871			Groom, Wallace P., 350 Pearl street.
1856			Guernsey, Egbert, M. D., 18 West Twenty-third street.
1864			Guernsey, R. S., M. D., 150 Broadway.
1869			Habicht, C. E., London.
1869			Hadden, John A., 38 Chambers street.
1871			Hall, Hon. A. Oakey, 13 West Forty-second street.
1868	220		Hall, Elial F., 37 Nassau street.
1869			Hallock, Mrs. Frances, 140 East Fifteenth street.
1869			Halsted, William M., 378 Broadway.
1872		L. M.	Hamersley, John W., 255 Fifth avenue.
1871			Hamilton, Alexander, Jr., 17 Washington square N.
1864			Hammond, Henry B., 20 Nassau street.
1871			Hand, Clifford A., 51 Wall street.
1870			Harris, R. Duncan, 91 Madison avenue.
1868		L. M.	Harris, Hon. Townsend, Union Club, Fifth avenue.
1870			Harrison, Prof. Thomas F., 146 Grand street.
1868	230		Hartt, Prof. Chas. F., M. A., Ithaca, N. Y.
1859		L. M.	Havemeyer, John C., 335 West Fourteenth street.
1870			Havens, Charles G., 20 Exchange place.
1870			Hawkes, Prof. W. Wright, 27 S. William street.
1872			Hawkins, Dexter A., 5 West Thirty-fourth street.
1872			Hawley, E. Judson, 47 Fifth avenue.
1868			Hayes, Isaac I., M. D., 51 West Tenth street.
1869			Hays, William J., 51 West Tenth street.
1869			Hazard, Rowland R., Jr., 110 Broadway.
1868			Hegeman, William, 208 Broadway.
1868	240		Hegeman, William A. Ogden, 55 Pine street.
1859			Henderson, John C., 464 Broome street.
1856			Herring, Silas C., 251 Broadway.
1870			Hess, Julius, 20 Exchange place.
1856			Hewitt, Abram S., 17 Burling slip.
1868			Hewlett, John D., 51 Wall street.
1872			Hoffman, William B., 48 West Twenty-second street.
1869			Hoffmann, Friedrich, Ph. D., 64 Sixth avenue.
1868			Hoguet, Robert J., 112 Duane street.
1872			Holbrook, Levi, P. O. box 536.
1870	250		Holmes, William H., 59 Beekman street.
1858		L. M.	Holton, David P., M. D., 148 East Seventy-eighth street.
1868			Hoppin, William J., 59 Pine street.
1868			Hoyt, David, 286 Cherry street.
1865			Hull, Amos G., 21 Park row.
1856			Hunt, Wilson G., 82 White street.
1856			Hunter, James, 220 East Tenth street.

Year of Election.			
1868			Huntington, Daniel, 49 East Twentieth street.
1868			Hurlbert, William H., World office.
1870			Hutchings, Hon. Robert C., 48 West Thirty-eighth street.
1869	260		Hutchins, Waldo, 40 Wall street.
1871			Huyshe, Wentworth, 59 Wall street.
1859			Ireland, John B., 200 Broadway.
1871			Jackson, H. A., 83 Wall street.
1868			Jacob, Ephraim A., 322 Broadway.
1870			James, Frederick P., 400 Fifth avenue.
1868			Jarvis, Nathaniel, Jr., 124 West Twenty-third street.
1852		L. M.	Jay, Hon. John, U. S. Ambassador, Vienna, Austria.
1872			Joachimsen, Jos. P., 240 Broadway.
1855			Johnson, Bradish, 117 Front street.
1868	270		Johnson, Hezron A., 26 Pine street.
1868			Johnson, Henry W., 22 East Thirty-fifth street.
1856			Johnston, James B., 90 Broadway.
1873			Johnston, John T., 119 Liberty street.
1868			Jones, Charles C., Jr., 61 Wall street.
1852		L. M.	Jones, John D., 51 Wall street.
1871			Jones, Walter R. T., 65 Wall street.
1868			Joy, Prof. Chas. A., Columbia College.
1870			Kane, J. Grenville, 346 Broadway.
1870			Kaufmann, Sigismund, 39 Nassau street.
1855	280		Kearny, Edward, 139 Front street.
1873			Kelley, Lieut. J. D. J., U. S. N., New York.
1869			Kelly, Eugene, 37 West Thirty-fourth street.
1872			Kendrick, Col. Henry L., U. S. A., West Point, N. Y.
1865			Kennedy, John A., 135 West Twenty-second street.
1854			Kennedy, Robert L., 29 Nassau street.
1865			King, George, 5 Mercer street.
1868			King, Oliver K., 31 Broadway.
1852			Kingsland, A. C., 114 Fifth avenue.
1868			Kirkland, Hon. Charles P., 21 Nassau street.
1872	290		Klamroth, Albert, 64 St. Mark's place.
1853		L. M.	Knapp, Shepherd, 33 Wall street.
1870			Kühne, Frederick, 113 Broadway.
1862			Lambert, E. W., M. D., 120 Broadway.
1868		L. M.	Lane, Smith E., 169 Broadway.
1856			Lanier, J. F. D., 29 Pine street.
1871			Larremore, Hon. Richard L., LL. D., 32 East Sixtieth st.

Year of Election.			
1859		L. M.	Lathers, Richard, 39 William street.
1868			Lawrence, Abraham R., 25 Nassau street.
1869		L. M.	Lawrence, John S., 117 William street.
1871	300		Lee, Ambrose, 877 Broadway.
1854			Lefferts, Marshall, 61 Broadway.
1859			Lenox, James, 53 Fifth avenue.
1868			Leonard, William H., 57 East Fifty-third street.
1868			Leslie, Frank, 537 Pearl street.
1871			Letson, Robert S., 68 South street.
1872		L. M.	Libbey, William, 361 West Twenty-third street.
1852		L. M.	Livingston, Cambridge, 145 Broadway.
1870			Loew, Hon. Frederick W., 618 Lexington avenue.
1857			Low, A. A., 31 Burling slip.
1873	310		Lydig, David, 62 Seventh avenue.
1870			Lyman, Edward H. R., 31 Burling slip.
1863			Mackie, Robert, 24 Beaver street.
1868			MacKellar, William, 164 Nassau street.
1871			Maclay, Robert, 432 Canal street.
1869			Maclay, Hon. William B., 68 Second avenue.
1872		N. R.	Macmillan, Frederick.
1868			McClure, George, 15 Union square.
1871			McCreery, James A., 202 Broadway.
1868			McLean, James M., 156 Broadway.
1868	320		McLean, Samuel, 133 Duane street.
1870			McMillan, Charles, M. D., 4 East Thirty-fourth street.
1859			McMullen, John, 1212 Broadway.
1856			Manners, David S., Jersey City, N. J.
1870			Marbury, Francis F., 64 Wall street.
1872		L. M.	Marie, Peter, 48 West Nineteenth street.
1868			Marsh, Luther R., 170 Broadway.
1863			Marshall, Chas. H., 38 Burling slip
1870			Marston, Charles E., 7 New street.
1868			Martin, Isaac P., 31 Nassau street.
1872	330		Martin, William R., 70 West Thirty-fifth street.
1869			Martine, Randolph B., 31 Nassau street.
1868			Marquand, Henry G., 43 Wall street.
1868			Matsell, George W., 164 Nassau street.
1872		L. M.	Matthews, Edward, 4 Broad street.
1872			Maury, Rev. Mytton, Fordham, N. Y.
1863			May, Lewis, 1 New street.
1871			Mayo, William S., M. D., 208 Fifth avenue.
1872			Meeker, H. G., 454 Lexington avenue.
1870			Menzies, William, 31 Nassau street.
1863	340		Merrick, John S., 805 Broadway.

Year of Election.			
1872			Meyer, F. William, 85 West Twenty-first street.
1870			Miles, Edward D., National Park Bank.
1869			Miller, Charles R., 607 Broadway.
1868			Miller, Edmund H., 20 Broad street.
1872			Miller, Morris S., 265 Broadway.
1868			Mitchell, Grove P., 51 Wall street.
1871			Mitchill, Samuel A., 62 West Fourteenth street.
1856			Monroe, Ebenezer, 565 Broadway.
1868			Montgomery, Archibald G., Jr., 35 Wall street.
1859	350	L. M.	Moore, Frank, Paris.
1853		L. M.	Moore, George H., LL. D., New York Historical Society.
1869			Moore, Henderson, 43 Mercer street.
1863		L. M.	Moore, W. H. H., 51 Wall street.
1868			Moreau, John B., 14 Second street.
1856			Morgan, Hon. E. D., 54 Exchange place.
1865			Morgan, William D., 70 South street.
1870			Morris, Harry M., 49 West Thirty-eighth street.
1866			Morris, Robert R., New Rochelle, N. Y.
1868			Morrison, Henry, 200 Broadway.
1864	360		Morton, Levi P., 30 Broad street.
1869		L. M.	Mount, Richard E., 335 Broadway.
1868			Mount, William S., 150 Duane street.
1869			Mumford, John P., 2 East Thirty-seventh street.
1856			Murdock, U. A., 313 Fifth avenue.
1868			Murphy, Hon. Henry C., Brooklyn, N. Y.
1868			Murphy, Hon. Thomas, 38 East Thirty-ninth street.
1870			Murray, D. Colden, 62 South street.
1870			Myer, Bvt. Maj.-Gen. Albert J., U. S. A., Washington, D. C.
1870			Myers, Alfred G., 244 East Thirteenth street.
1852	370		Myers, Col. T. Bailey, 127 Mercer street.
1870			Neilson, William H., 70 Broadway.
1868			Newberry, Prof. John S., M. D., Columbia College.
1856			Niblo, William, 50 West Twenty-eighth street.
1856			Nichols, Effingham H., 9 Pine street.
1859		L. M.	Norrie, Adam, 303 Fifth avenue.
1870			Norton, Henry G., 26 Park place.
1871			O'Callaghan, Edmund B., LL. D., 651 Lexington avenue.
1869			O'Conor, Charles, 61 Wall street.
1868	380		Ogden, Alfred, 51 Wall street.
1859			Ogden, William B., 52 Wall street.
1857			Opdyke, George, 25 Nassau street.
1869			O'Rielly, Henry, 1250 Fourth avenue.

Year of Election.			
1871			Palmer, Courtlandt, Jr., 346 Broadway.
1872			Parish, Henry, 52 Wall street.
1869			Parker, John A., 39 William street.
1868			Parton, James, 308 East Eighteenth street.
1868			Paulison, John P., 52 Wall street.
1871			Pavy, Octave.
1871	390		Peabody, Charles A., 167 Broadway.
1869			Perault, George, 292 Pearl street.
1868			Pfeiffer, Carl, 113 Broadway.
1860		L. M.	Phelps, Royal, 45 Exchange place.
1868			Philbin, Stephen, 82 Clinton place.
1862			Phillips, George W., 120 Broadway.
1855			Pierrepont, Hon. Edwards, 16 Wall street.
1852		L. M.	Pierrepont, Henry E., 30 Broadway.
1852		L. M.	Poor, Henry V., 68 Broadway.
1860			Potter, Hon. Clarkson N., 61 Wall street.
1871	400		Potter, Howard, 61 Wall street.
1868			Powers, William P., 74 Broadway.
1852		L. M.	Prime, Frederick, 26 Broad street.
1859		L. M.	Prime, Frederick E., 26 Broad street.
1872			Prime, Temple, 26 Broad street.
1868			Prime, Wm. C., 38 East Twenty-third street.
1869			Pruyn, Hon. John V. L., LL. D., Albany, N. Y.
1868			Pumpelly, Raphael.
1859		L. M.	Punnett, James, 46 Wall street.
1859			Purser, George H., 82 Nassau street.
1870	410		Putzel, Mayer, 34½ Pine street.
1857			Pyne, Percy R., 44 South street.
1856			Randolph, A. D. F., 770 Broadway.
1859			Rapallo, Hon. Charles A., 17 West Thirty-first street.
1868			Raven, Anton A., 51 Wall street.
1859		L. M.	Reckendorfer, Joseph, 59 John street.
1868			Redfield, Amasa A., 20 Nassau street.
1873			Reed, Mrs. Sylvanus, 6 East Fifty-third street.
1873			Remington, A. G.
1856			Remsen, William, 26 Waverley place.
1868	420		Rhinelander, Wm. C., 14 Washington square North.
1873			Rich, John B., M. D., 35 East Tenth street.
1856			Richards, Joseph W., M. D., 12 Clinton place.
1868			Richmond, Henry A., Buffalo, N. Y.
1856			Riker, John H., 135 East Forty-sixth street.
1872		L. M.	Robbins, Chandler, 116 West Twenty-first street.
1868			Roberts, Marshall O., 126 Warren street.
1871			Robinson, Douglas.

Year of Election.			
1871			Robinson, Hon. Hamilton W., 5 East Sixty-fifth street.
1872			Roelker, Bernard, 57 Pine street.
1861	430	L. M.	Rogers, C. B., 280 Fifth avenue.
1869			Rogers, David L., M. D., 454 Lexington avenue
1869			Roosevelt, Theodore, 94 Maiden lane.
1868			Rose, Cornelius, 320 Broadway.
1854			Ruggles, Hon. Samuel B., 6 Wall street.
1868			Russell, John A., 264 Sixth avenue.
1870			Rutherfurd, John A., 342 East Thirteenth street.
1854			Rutherfurd, L. M., 104 East Tenth street.
1868			Sanger, A. L., 243 Broadway.
1869			Savage, John, Morrisania, N. Y.
1870	440		Schafer, Samuel M., 15 Broad street.
1870			Schafer, Simon, 15 Broad street.
1859		L. M.	Schell, Augustus, 40 Wall street.
1870		L. M.	Schell, Richard, 22 West Twenty-first street.
1856			Schermerhorn, W. C., 68 Wall street.
1856			Schieffelin, S. A., Geneva, N. Y.
1869			Schmidt, Oscar E., 22 Burling slip.
1871			Schnerr, Constant, 40 Burling slip.
1856			Schuchardt, Frederick, 40 Exchange place.
1868			Schultz, Jackson S., 343 Pearl street.
1859	450	L. M.	Schultz, John H., 9 Spruce street.
1856			Sears, Herman B., 18 Maiden lane.
1870			Seligman, James, 21 Broad street.
1870			Seligman, Jesse, 21 Broad street.
1870			Seligman, Joseph, 21 Broad street.
1854			Sewall, Henry F., 78 South street.
1868			Seward, Clarence A., 29 Nassau street.
1871			Shaler, Maj.-Gen. Alex'r, N. G. S. N. Y., 346 West Twenty-eighth street.
1868			Shea, Hon. George, 205 West Forty-sixth street.
1856			Sherman, W. Watts, 11 Nassau street.
1870	460		Sherwood, John, 60 Wall street.
1872			Simpson, Brig.-Gen. Jas. H., U. S. A., Mobile, Ala.
1870			Sistare, George K., 24 Nassau street.
1870			Slevin, Edward P., 120 Broadway.
1869			Slevin, James M., 120 Broadway.
1873			Slevin, Thomas E., 53 Lispenard street.
1868			Smales, Holbert, 33 Wall street.
1868			Smith, Augustus F., 31 Nassau street.
1868			Smith, C. Bainbridge, 115 Broadway.
1873			Smith, James M., Jr., 25 Chambers street.
1858	470		Smith, James O., M. D., 81 Clinton place.

Year of Election.			
1870			Smyth, Frederick, 21 Nassau street.
1868			Spencer, Col. Charles S., 8 Beach street.
1873			Spencer, James C., 287 Broadway.
1856			Spofford, Paul N., 29 Broadway.
1868			Squier, Hon. E. George, F. R. S., 135 E. Thirty-ninth street.
1859			Stallknecht, F. S., 37 Nassau street.
1856			Stebbins, Henry G., 40 Broadway.
1872			Steiger, E., 22 Frankfort street.
1871			Steinwehr, Brig.-Gen. A. von, New Haven, Conn.
1872	480		Stengel, Prof. Frederick, 51 East Twentieth street.
1870			Stephens, Edward, St. Cloud Hotel.
1872			Stern, Myer, 486 Broadway.
1869			Sterne, Simon, 35 Wall street.
1870			Stevens, Simon, 29 Broadway.
1859			Stewart, A. T., 355 Fifth avenue.
1870			Stewart, Charles J., 51 Wall street.
1870			Stoughton, Charles B., 50 Clinton place
1870			Stoughton, Edwin W., 52 Wall street.
1870			Stoughton, Henry E., 50 Clinton place.
1860	490	L. M.	Stout, Francis A., 21 East Ninth street.
1870			Stout, John, 171 Broadway.
1858			Straznicky, E. R., M. D., Ph. D., Astor Library
1869			Strebeigh, Robert M., 7 East Forty-fifth street.
1873			Strong, Charles E., 68 Wall street.
1859			Strong, Geo. T., 68 Wall street.
1860			Stuart, Alexander, 167 Chambers street.
1855			Stuart, Robert L., 154 Fifth avenue.
			Sturgis, Frederick, 125 Front street.
1872		L. M.	Stuyvesant, Rutherfurd, 104 East Tenth street.
1861	500	L. M.	Suckley, George, M. D.
1870			Swan, William H., 78 South street.
1857			Taylor, Bayard.
1868			Taylor, Douglas, 89 Nassau street.
1870			Taylor, George, Washington, D. C.
1855			Tellkampf, T. A., M. D., 142 West Fourth street.
1870			Tiedeman, Nicholas, 27 South William street.
1856			Tiffany, Charles L., 15 Union square.
1868			Tilden, Hon. Samuel J., 15 Gramercy Park.
1870			Tillman, Prof. S. D., room 22, Cooper Institute.
1870	510		Thomson, James, 69 Wall street.
1861			Thomson, Wm. H., M. D., 111 West Forty-third street.
1857		L. M.	Thompson, David, 52 Wall street.
1854			Thompson, Rev. Joseph P., D. D., LL. D., in Europe.

Year of Election.			
1872			Tower, Maj.-Gen. Z. B., U. S. A., Army building, corner Greene and Houston streets.
1856			Townsend, Randolph W., 247 Broadway.
1859			Tracy, Charles, 50 Wall street.
1872			Tracy, William, 326 Fifth avenue.
1857			Tremain, Edwin R., 167 Broadway.
1870			Tuckerman, Lucius, 90 Broadway
1859	520		Turney, P. W., 110 Broadway.
1872			Tyler, Arthur W., Astor Library.
1872			Van Alen, Gen. J. H., 15 St. Mark's place.
1872			Van Alen, James J., 15 St. Mark's place.
1870			Van Brunt, Hon. Charles H., 27 West Thirtieth street.
1868			Van Cott, Hon. Joshua M., 15 Nassau street.
1869			Vanderpoel, Aaron J., 291 Broadway.
1872			Van Ness, Edward, 141 Broadway.
1868			Van Santvoord, C., 6 Hanover street.
1868			Van Vorst, Hon. Hooper C., 106 Broadway.
1859	530		Varnum, Joseph B., 110 Broadway.
1854			Viele, Gen. Egbert L., 115 Broadway.
1869			Wadsworth, E. Clifford, Brooklyn, E. D., N. Y.
1868			Walker, Wm. Augustus, 62 Wall street.
1869			Ward, Gen. Elijah, 561 Fifth avenue.
1859		L. M.	Ward, George C., 52 Wall street.
1870			Ward, Thomas W., 52 Wall street.
1856			Warren, James K., 35 Pine street.
1853		L. M.	Watts, Ridley, 22 East Twentieth street.
1854			Webb, William H., 200 Lewis street.
1869	540		Weber, Leonard, M. D., 33 East Twenty-seventh street.
1870			Webster, Sidney, 243 East Eighteenth street.
1873			Weeks, John A., 58 Wall street.
1869			Welles, James H., Fifth Avenue Hotel.
1872			Wells, Jacob, 658 Broadway.
1868			Wells, J. H.
1865			Wells, Samuel R., 389 Broadway.
1865			Wendell, Jacob, 59 Worth street.
1856			Westermann, B., 471 Broadway.
1870			Weston, Theodore, C. E., 120 Broadway.
1872	550		Wetmore, George C., 365 Greenwich street.
1854		L. M.	Wetmore, Samuel, 59 Pine street.
1872		L. M.	Wetmore, William B., U. S. A., 15 Waverley place.
1870			Whitaker, Thomas A., Union Club, Fifth avenue.
1868			White, Alexander M., 63 Broadway.
1856			White, Hon. John H., 169 Broadway.

Year of Election.			
1868			Whitewright, Wm., Jr., 88 Wall street.
1871			Wilde, Samuel, Jr., Montclair, N. J.
1868			Williams, B., 41 East Thirty-eighth street.
1872		L. M.	Williams, Stephen C., 15 Waverley place.
1857	560		Wilson, Harris, 5 Dey street.
1870		L. M.	Wilson, Gen. James Grant, 15 East Seventy-fourth street.
1860			Winston, Frederick S., 146 Broadway.
1854		L. M.	Witthaus, G. H., 318 Broadway.
1854		L. M.	Witthaus, R. A., 546 Pearl street.
1869			Wreaks, Charles F., 54 William street.
1870			Wright, E. Kellogg, National Park Bank.
1871			Youngs, Alfred, 41 South street.
1871			Youngs, Henry I., 78 South street.
1868			Zborowski, Martin, Morrisania, N. Y.

PART I.

TRANSACTIONS

OF

THE SOCIETY FOR 1872.

TRANSACTIONS OF THE SOCIETY FOR 1872.

Regular monthly meeting of the American Geographical Society, Cooper Institute, New York, February 20th, 1872. FRANCIS A. STOUT, Esq., one of the vice-presidents, presided.

On motion of Mr. Remsen the reading of the minutes of the annual meeting, January 30th, 1872, was postponed.

Gen. Geo. W. Cullum, on behalf of the Council, reported the names of the following candidates as having been recommended for election as

Resident Members—Mayer Stern, David C. Blodgett, George Gibbs, F. William Meyer, Admiral S. W. Godon, U. S. N., Geo. P. Wetmore, Walston H. Brown, Edward K. Alburtis, Arthur W. Tyler, Israel Corse, Z. B. Tower, U. S. A., E. Judson Hawley, H. L. Kendrick, U. S. A., Wm. B. Hoffman, James W. Gerard, Jr., James Bryce; and as

Life Members—John W. Hamersly, Stephen C. Williams, William B. Wetmore.

No ballot being called for, on motion they were declared duly elected members of the Society.

Mr. Remsen, in the absence of the treasurer, Henry Clews, reported a cash balance in the treasury of $147.67.

Mr. Elial F. Hall, the librarian, reported that during the past month 190 accessions had been made to the library and map-room.

On motion both reports were accepted and ordered to be placed on file.

The president then read a letter which had been addressed to him by the Rev. B. F. De Costa, inclosing the MS. copy of a map by Alfonso, made in 1545.

On motion the letter was referred to the recording secretary to be filed.

The president then introduced to the Society Prof. William Newcomb, of Cornell University, Ithaca, who read a paper on "Hispaniola: its Past, Present, and Future."

After the conclusion of the paper, and on motion of Judge Kirkland, seconded by Mr. Hall, the thanks of the Society were presented to Prof. Newcomb for his interesting and instructive paper, and a copy of it requested for publication in the Journal.

On motion the meeting then adjourned.

Regular monthly meeting of the American Geographical Society, Cooper Institute, New York, March 19th, 1872. In the absence of the president, Chief-Justice Charles P. Daly, Professor THEODORE W. DWIGHT, LL. D., presided.

The minutes of the last annual meeting, January 30th, and of the regular monthly meeting, February 20th, 1872, were read and approved.

Mr. Stout, on behalf of the Council, reported the names of the following candidates as having been approved for election as

Resident Members—J. H. Van Alen, Jacob Welles, Bernard Roelker, Thomas Rigney, Albert Klamroth, and James R. Trueheart; as

Life Members—Edward Matthews and James J. Van Alen; and as a

Corresponding Member—By Mr. Francis A. Stout—Prof. Herrmann von Schlagintweit Sakünlünski, President of the Geographical Society in Munich.

By Chief-Justice Charles P. Daly, as a corresponding member, Charles Van Benthuysen, Albany, N. Y.

No ballot being called for, on motion these gentlemen were declared duly elected members of the Society.

Mr. Moore, on behalf of the treasurer, Mr. Henry Clews, reported a cash balance in the treasury of $849.49.

Mr. Elial F. Hall, the librarian, reported that during the past month 313 accessions had been made to the library and map-room by purchase and donation.

The recording secretary reported that he had received letters from President Negri, Prof. Hawkes and Mr. Thomas E. Davis, in Rome, all evincing the liveliest interest in the welfare and prosperity of the Society.

On motion these various reports were accepted and ordered to be placed on file.

Mr. Francis A. Stout, one of the vice-presidents, then offered the following preambles and resolution, to wit:

Whereas, During the last year there has been established in Munich, in Bavaria, a Geographical Society containing 500 members, and having for honorary president His Majesty the King; and

Whereas, The said Society has transmitted its Journal and Transactions, and expresses a desire for close correspondence and reciprocal exchange; be it

Resolved, That this Society welcomes to the study and the diffusion of geographical science its younger sister of Munich; and, congratulating her upon a beginning unusually prosperous and energetic, begs to send the expression of the warm sympathies it elicits in our midst, and to assure her that any and all services which this Society can render the geographers of Munich are freely and frankly proffered.

Which resolution, after having been seconded by Mr. Remsen, was unanimously adopted.

The president then introduced to the Society the Rev. Mytton Maury, who read a paper on "Martin Behaim's Globe and its Influence upon Geographical Science."

After the conclusion of the paper, Col. T. Bailey Myers submitted the following remarks:

Mr. President,—If the object of our Society is to foster exploration and to garner the results of scientific research; if we are watching, even now, with interest, the progress of the fear-

less little band who were with us here a few months since, on the eve of the departure to grapple, amidst the icebergs, the practicability of the problem of a North-west Passage,—it is but natural that we should be deeply interested in such particulars as have been afforded us, this evening, of the appliances, motives, and surroundings of the men who contemplated a western passage to India four centuries ago. The address to which we have listened this evening has been delivered by one whose name is not unfamiliar in scientific circles or amongst students, and whose labors, in his professional sphere, have been appreciated by many who have listened to him to-night, and who can now bear witness how gracefully he can unite the labors of the pastor with those of the scholar. In following him through his interesting details of the researches and the explorations of Martin Behaim, we cannot but appreciate anew our debt of gratitude to the men who performed the thankless task of developing the appliances and conceiving and propaganding the explorations by which others were enabled to execute the voyages which finally culminated in the acquisition of a world, and conferred imperishable glory on their names. The application of the astrolabe, and the abandoning of the time-honored route of exploration, along the African coast, for steering a bold course westward in pursuit of Cathay and fabled lands as yet unexplored, resulted in the addition of a continent, in the greatness and progress of which the Old World, while admitting a sister in the family of nations in the present, is already looking for a rival in intelligence, wealth, and progress. Whether to Toscanelli, to Behaim, or to Columbus we are indebted for this bold departure from the beaten path of exploration, it has been instructive to hear their relative actions recalled, where each is worthy of our gratitude, and participated in a course producing so brilliant a result. We appreciate the value of the discovery of the mariner's compass more fully when we have recalled to us the faults which rendered the astrolabe of so little value when it did not please the stars to shine, or the sea to be still; and we sympathize with the men who rose superior to the temptations which their surroundings and vocations in life held out to them to devote their entire attention to their daily duties, and what was then, as now, popularly considered the greatest achievement,—the acquisition of money,—

but who consecrated a portion of their time and earnings to studies and experiments tending to the increase of the area of the world, as then known, and the benefit of its inhabitants. To these men their posterity, in reaping the advantages of their labors, is singularly indebted for its gratitude, but, most of all, those who enjoy the privileges of a citizenship and a participation in the wonderful progress of a continent which, without their united exertions, might still have remained a *terra incognita.*

Of these, Martin Behaim was a brilliant example; on him the title "merchant prince," often since applied, was justly bestowed; for, beyond the money circles in which he had won it, it is recognized and honored, and in "leaving the multiplication-table and advancing to division" he erected a monument more enduring than the one he had placed on the coast of Africa — destined to stand after his commercial ventures were forgotten, and the attendant fruits of his industry — in so exemplary a manner. During his lifetime he merited to have been rewarded in a manner in accordance with his studies as a geographer, by having his name continued on the map in connection with the strait of which we have heard the discovery so justly attributed to him. May we not hope that his mantle may yet fall upon, and his spirit be transmigrated into, some of our own numerous list of merchant-princes, and that in this Society they may find a medium of emulating the example of one, a former president (Mr. Grinnell), in extending its means and usefulness? In so doing they would materially aid the exertions of the limited number of gentlemen who yearly make up the difference between the Society's limited income from membership, and its outlays, which, including additions to its collection, are always largely in excess of its receipts. In this they would emulate the claims of Martin Behaim on posterity as a merchant-prince, the fruits of whose labor extended beyond the space of life.

Mr. Myers then moved that the thanks of the Society be presented to the Rev. Mytton Maury for his graceful, scholarly, and instructive paper, the reading of which had been listened to with such marked attention by the members of the Society, and that he be requested to furnish a copy for publication in our Journal.

Mr. Robert Dodge seconded the motion with some interesting remarks, describing his own inspection of the globe at Nuremberg, and suggesting a hope that a copy might soon be added to the collection. He also moved that the paper be printed.

The resolutions were adopted, and the meeting then adjourned.

Regular monthly meeting of the American Geographical Society, held at the hall of the New York Historical Society, corner Second avenue and Eleventh street, New York, April 16th, 1872. Chief-Justice CHARLES P. DALY, the president, in the chair.

The minutes of the last meeting, March 19th, 1872, were read and approved.

Mr. Stout, on behalf of the Council, reported the names of the following candidates as having been approved for election as

Resident Members—Eugene E. Conklin, Horace A. Foote, S. W. Bridgham and Prof. Frederick Stengel.

No ballot being called for, on motion these gentlemen were declared duly elected members of the Society.

Mr. Paul B. Du Chaillu proposed as an

Honorary Member—His Majesty Charles XV, Louis Eugene, King of Sweden and Norway;

And by the same as a

Corresponding Member—Prof. A. E. Nordenskjöld, of Stockholm.

On motion it was

Resolved, That His Majesty the King of Sweden and Prof. Nordenskjöld be declared duly elected members of the Society, without reference to the Council.

Which was unanimously adopted.

The recording secretary read, in the absence of Mr. Clews, the treasurer's report, exhibiting a cash balance in the treasury of $853.57.

Mr. Hall, the librarian, read his monthly report, show

ing that during the past month eighty additions had been made to the library, both by purchase and donation.

On motion both these reports were accepted and ordered to be placed on file.

The president then introduced to the Society the distinguished African traveller, Paul B. Du Chaillu, Esq., who had visited, during the last summer, Sweden, Norway, and the highest latitudes of Northern Europe, and would now give a brief account of his observations and experiences.

Shortly after Mr. Du Chaillu began to address the audience, the Japanese Ambassadors, now on a visit to this country, entered by invitation, and were introduced to the Society by the president.

Associate Justice E. S. Hiraka, of Yeddo, Japan, one of the Ambassadors, then expressed in appropriate English the thanks of himself and colleagues for the honor of appearing before this Society.

After the conclusion of his address, Mr. Du Chaillu presented to the Society, for its collection, a sleigh and a set of furs which he had brought from Norway.

On motion of the Hon. James W. Beekman, and seconded by Mr. Kirkland, the thanks of the Society were presented to Mr. Du Chaillu for his very interesting address and for his valuable donation of curiosities.

On motion the meeting then adjourned.

Regular monthly meeting of the American Geographical Society, held at the hall of the New York Historical Society, New York, May 21st, 1872. Chief-Justice CHARLES P. DALY, in the chair.

The minutes of the last meeting, April 16th, 1872, were read and approved.

Mr. Stout, on behalf of the Council, reported the names of the following candidates as having been approved for election as

Resident Members—Peter Marié, B. L. Goulding, E. V. Clark, Gen. S. W. Crawford, U. S. A., Rev. Mytton Maury, E. Steiger;

And by Chief-Justice Charles P. Daly, as

Corresponding Members—Charles Maunoir, General Secretary Geographical Society, Paris; Dr. A. Bastian, President of the Geographical Society, Berlin;

By E. R. Straznicky, recording secretary, as

Corresponding Members—M. A. Becker, General Secretary of the Geographical Society of Vienna; Dr. E. Behm, of Justus Perthe's Geographical Institute in Gotha, and assistant editor of Petermann's *Mittheilungen*.

No ballot being called for, on motion these gentlemen were declared duly elected members of the Society.

Mr. Remsen, on behalf of Mr. Clews, read the treasurer's report, exhibiting a cash balance in the treasury of $1,301.85.

Mr. Elial F. Hall, the librarian, read his monthly report, showing that eighty-nine items had been added to the library of the Society by donation.

On motion both these reports were accepted and ordered to be placed on file.

The president then announced, with appropriate remarks, the death of our late associate, John D. Wolfe.

On motion of Mr. Stout, seconded by Mr. Remsen, it was unanimously

Resolved, That a special committee of three be appointed by the president to draft suitable resolutions on the death of Mr. Wolfe, and to report the same to the next Council meeting.

The president accordingly appointed Messrs. Stout, Remsen, and Drowne as such committee.

The president called the attention of the Society to a donation of rare Mexican books by Mr. W. H. Hurlbert, accompanied by the following letter to the recording secretary:

Manhattan Club, 96 Fifth Ave.,
May 20th, 1872.

My Dear Sir,—Will you kindly allow me—as I find it will be impossible for me to attend the meeting of the Society to-morrow—to present, through you, the accompanying contributions to its collections of works relating to America? I procured them in Mexico, where, through the kind and invaluable assistance of Mr. Joaquin Icezbalceta, the first of Mexican bibliographers, and of the Secretary of the American Legation, Mr. Bliss, who is making an assiduous study of Mexican philology and archæology, I succeeded in picking up quite a number of works upon these subjects. The other Aztec works are of more value philologically, I suspect, than theologically. Mr. Melgar's curious treatise on the Symbolism of the Mexican, as compared with that of the Oriental nations, was handed to me by the author himself, who is, at least, as devout a believer in his own theories as the Abbé in his.

I think the Society will do me the favor to accept these trifles, and I beg you to believe me,

My dear sir,
Very faithfully yours,
WM. HENRY HURLBERT.

On motion it was

Resolved, That the thanks of the Society be presented to Mr. Hurlbert for his valuable donation.

The president then informed the Society of the presence of Admiral Inglefield, of the Royal Navy, the distinguished Arctic traveller and author.

The president now introduced to the Society Professor Hartt, of Cornell University, who delivered a discourse on his explorations in the Lower Amazon, accompanied by stereoscopic views.

On motion of Hon. Judge Davies, seconded by Mr. Stout, the thanks of the Society were presented to Prof. Hartt for his very interesting and instructive discourse, and a copy of it requested for publication in the Journal.

On motion the meeting then adjourned.

Regular monthly meeting of the American Geographical Society, held at the hall of the New York Historical Society, corner of Second avenue and Eleventh street, New York, November 12th, 1872. Chief-Justice CHARLES P. DALY, the president, in the chair.

The minutes of the last meeting, May 21st, 1872, were read and approved.

Judge Wm. E. Curtis, on behalf of the Council, reported the names of the following candidates as having been recommended for election as

Resident Members—Jonathan Edwards, Robert M. Grinnell, Gen. James H. Simpson, U. S. A.;

And by Francis A. Stout, Esq., as

Corresponding Members—Monsieur Vivien de St. Martin, Vice-President Geographical Society, Paris;

By Prof. Hartt, of Cornell University,

W. Chandless, Gold Medallist of the Royal Geographical Society, London.

No ballot being called for, on motion these gentlemen were respectively declared duly elected resident and corresponding members.

In the absence of the treasurer, Mr. Henry Clews, the recording secretary presented his monthly report, exhibiting a cash balance in the treasury of $482.68.

Mr. Elial F. Hall, the librarian, presented his monthly report, showing that since the last report had been rendered (on the 21st May, 1872), in all, six hundred and fifty-one additions were made to the library, both by purchase and donation.

On motion both these reports were accepted and ordered to be placed on file.

Mr. Remsen, on behalf of the Council, presented the following report of the special committee appointed on the 21st of May, 1872, relative to the death of Mr. John D. Wolfe, as one of our associates.

The Council respectfully presents the following report:

On the 1st of June, 1872, a meeting of the Council was

held at the Society's rooms in the Cooper Institute, at eight o'clock P. M., Chief-Justice Charles P. Daly, *pro tem.*, presiding, when Mr. F. A. Stout, as chairman of the special committee appointed on the 21st of May, 1872, with regard to the death of our late associate, John David Wolfe, presented the following preamble and resolutions for adoption:

Whereas, In the death of John David Wolfe, one of our earliest members, not only this Society, but the whole community, has sustained a great and irreparable bereavement; therefore,

Resolved, That, in the death of Mr. Wolfe, we lament a generous benefactor and a kindly and liberal man, seeking unceasingly for opportunities to carry out and complete, by deeds, the great charity of his heart.

Resolved, That we cherish with loving recollection the memory of his bright example, of his pure patriotism, of his tender solicitude for the wants and sufferings of others, and of that gentle and considerate disposition that, during a long life, accompanied the strictest integrity, the highest honor, and the most exalted piety.

Resolved, That the recording secretary be directed to transmit to the family of the deceased a copy of these resolutions, with the antecedent proceedings.

On motion the preamble and resolutions were unanimously adopted, and on the 3d of June a copy of them was transmitted, by the recording secretary, to the family of the deceased.

Respectfully submitted.

CHARLES P. DALY,
Chairman of Council pro tem.

On motion of Mr. Hall, seconded by Mr. Stout, the report was accepted and ordered to be placed on file.

The president then called the attention of the Society to the following very valuable donations which had been made to the library and map-room by the following persons:

a. Baron Osten-Sacken, late Imperial Russian Consul-General — A collection of the Russian Imperial *cadaster*, or survey-maps, of the Russian Empire.

b. Admiral Inglefield, of the British Navy — The whole collection of maps and charts of the British coast, numbering over one hundred and fifty.

c. Major Constable — A collection of Chinese and Japanese maps.

On motion of Judge Wm. E. Curtis, seconded by Mr. Stout, it was

Resolved, That the thanks of the Society be presented, through the recording secretary, to the various donors for their valuable donations.

The president then introduced to the Society Prof. T. Sterry Hunt, of Boston, who read a paper on the Paleo-Geography of North America.

After the conclusion of the reading of this paper, and on motion of Judge Wm. E. Curtis, seconded by Mr. Remsen, the thanks of the Society were presented to Prof. Hunt for this very interesting and instructive paper, and a copy of it was requested for publication in the Journal.

On motion the meeting then adjourned.

Regular monthly meeting of the American Geographical Society, held at the hall of the New York Historical Society, New York, December 17th, 1872. Chief-Justice CHARLES P. DALY, the president, in the chair.

The minutes of the last meeting, November 12th, 1872, were read and approved.

Col. Conkling, chairman of the Council, reported that the names of the following candidates had been approved for election as

Resident Members — Frederick Macmillan, Temple Prime, Samuel S. Cox, Levi Holbrook, Dexter A. Hawkins, Morris S. Miller, Dunham Jones Crain; and as a

Life Member—William Libbey;

By Francis A. Stout, as a

Corresponding Member—Prof. Charles H. Hitchcock, Ph. D., Hanover, N. H.

No ballot being called for, on motion these gentlemen were declared duly elected resident and corresponding members.

In the absence of the treasurer, Mr. Geo. Cabot Ward presented his monthly report, exhibiting a cash balance in the hands of the treasurer of $245.92.

Mr. Elial F. Hall, the librarian, presented his monthly report, showing that in all twenty-five items had been added by donation to the library and map-room.

On motion both these reports were accepted and ordered to be placed on file.

Mr. Francis A. Stout proposed the following amendments to the by-laws of the Society, to wit:

Resolved, That chapter V of the by-laws be amended by substituting "nine" for "eight," and by striking out the words "a librarian;" that the words "for the past year" be inserted after the word "dues" on the second line of section 2 of chapter VI; that the word "he" be substituted for the words "the librarian" in chapter XIII; and that the whole of said chapter, as so amended, be added to the end and as the final part of section 6 of chapter XII; and as to chapter XIII, that the same be abrogated, and that all the succeeding chapters be renumbered so as to follow successively from chapter XII.

On motion the proposed amendments were laid on the table, and by the existing by-laws will have to be taken up for final adoption at the next monthly meeting.

On motion of Dr. J. W. Richards the following special committee was appointed by the president to nominate suitable officers for the next annual election in January, namely: Messrs. Richards, S. D. Tillman, and Horatio M. Allen.

The president then introduced to the Society Dr. J. T.

Rothrock, of Wilkesbarre, Pa., who read a paper on "Our North-west: its Resources and its Inhabitants."

After the conclusion of the paper, and on motion of the Hon. Hiram Barney, seconded by Mr. Stout, the thanks of the Society were presented to Dr. Rothrock for his very interesting and instructive paper, and a copy of it was requested for publication in the Journal.

On motion the meeting then adjourned.

Annual meeting of the American Geographical Society, Cooper Institute, New York, January 28th, 1873. In the absence of Chief-Justice Daly, the president, Col. CONKLING, one of the vice-presidents, occupied the chair.

The minutes of the last meeting, December 17th, 1872, were read and approved.

Col. Conkling, as chairman, presented the annual report of the Council, which on motion was accepted and ordered to be placed on file.

Mr. Henry Clews, the treasurer, read his annual report, exhibiting a cash balance in the treasury of $58.05, and stating that the Society is now entirely out of debt.

On motion the treasurer's report was accepted and ordered to be placed on file.

Mr. Elial F. Hall, the librarian, read his annual report, showing that during the past year one thousand three hundred and fifty-six items had been added to the Society's library and map-room.

On motion the librarian's report was accepted and ordered to be placed on file.

Col. Conkling, as chairman of the Council, then reported the names of the following candidates as having been approved for election as a

Resident Member—John J. Casey;

And by Mr. Francis A. Stout, as a

Corresponding Member —General Thomas B. Van Buren, U. S. Commissioner-General to the Vienna Exposition.

And by Mr. Robert Dodge, as a

Corresponding Member — Dr. J. T. Rothrock, Wilkesbarre, Pa.

No ballot being called for, on motion these gentlemen were declared duly elected resident and corresponding members.

The recording secretary then read the amendments to the by-laws of the Society as proposed at the last monthly meeting, on December 17th, 1872.

On motion these amendments were accepted, and the by-laws so amended declared to be in force.

Dr. Richards, as chairman of the Nominating Committee, then reported that the names of the following gentlemen are recommended for election, as officers of the Society, for the ensuing year:

President — CHARLES P. DALY, LL. D.

Vice-Presidents — F. A. CONKLING, FRANCIS A. STOUT, T. BAILEY MYERS.

Foreign Corresponding Secretary — JAS. MUHLENBERG BAILEY.

Domestic Corresponding Secretary — W. H. H. MOORE.

Recording Secretary — E. R. STRAZNICKY, M. D., Ph. D.

Treasurer — HENRY CLEWS.

Council — WM. REMSEN, W. T. BLODGETT, W. E. CURTIS, THEO. W. DWIGHT, LL. D.; GEO. W. CULLUM, U. S. A.; GEO. CABOT WARD, ELIAL F. HALL, THEODORE ROOSEVELT, WM. JONES HOPPIN.

The president then appointed Messrs. John W. Hamersly and Clinton Gilbert as tellers, who reported that the names of the gentlemen as recommended on the ticket were unanimously elected.

On motion they were then declared duly elected officers of the Society for the year 1873.

The president then introduced to the Society Dr. Augustus Le Plongeon, who read a paper on "The Coincidences

between the Monuments of Ancient America and those of Assyria and Egypt."

After the conclusion of the paper, and on motion of Dr. Richards, the thanks of the Society were presented to Dr. Le Plongeon, and a copy was requested for the archives of the Society.

On motion the meeting then adjourned.

E. R. STRAZNICKY,
Recording Secretary.

ANNUAL REPORT OF THE COUNCIL FOR 1872.

Rooms of the American Geographical Society, Cooper Institute, New York, *Jan.* 28*th*, 1873.

Since the date of the last annual report eight stated meetings of the Council and seven meetings of the Society have been held, and one public reception has been given in the large hall of the Cooper Union.

At the last annual meeting, which was held on the 30th of January, 1872, the present board of officers was elected. Professor D. C. Gilman, then of the Sheffield Scientific School of Yale College, now the president of the University of California, delivered the annual address, selecting as his subject "American Contributions to Geographical Science during the Last Year."

On February 20th ensuing, Prof. Wm. Newcomb, of Cornell University, read a paper on "Hispaniola: its Past, Present, and Future."

On March 19th, Rev. Mytton Maury, of Fordham, read a paper on "Martin Behaim's Globe, and its Influence upon Geographical Science."

On April 16th, Monsieur Paul B. Du Chaillu gave an account of his "Observations and Experiences during the Last Summer in Sweden, Norway, and the Highest Latitudes of Northern Europe."

On May 21st, Prof. Hartt, of Cornell University, delivered a discourse, illustrated by stereoscopic views, on his "Explorations in the Lower Amazon."

On November 12th, Prof. T. Sterry Hunt, LL. D., F. R. S., of Boston, read a paper on "The Paleo-Geography of North America."

On November 26th, a reception was given by the Society to Mr. Henry M. Stanley, the discoverer of Livingstone.

On December 17th, Dr. J. T. Rothrock, of Wilkesbarre, Pa., read a paper on "Our North-West: its Resources and its Inhabitants."

The roll of resident members has continued to increase, as will be seen from the following statement:

Number of resident members on January 30, 1872	554
Number since added	56
Total	610
Deduct for deaths and resignations	20
Number remaining January 28, 1873	590

Among the names of those who will be painfully missed from the rolls of the Society, especial mention is due to two of its most steadfast friends and generous benefactors, Prof. Samuel F. B. Morse and John David Wolfe, Esq. The former, whose name is so intimately connected with the earliest geography of the United States, has left to the Society a legacy of one thousand dollars for the endowment of a medal to be awarded for distinguished services in the field of geographical science and explorations.

The annual report of the treasurer, Henry Clews, Esq., exhibits a satisfactory condition of the finances of the Society. In addition to the regular income, a special, private subscription has been set on foot, which promises to yield a further sum of twelve hundred dollars per annum for the next two years.

From the annual report of the librarian, Elial F. Hall, Esq., it will be seen that considerable and valuable additions have been made both to the library and to the department of maps and charts, amounting in the aggregate to one thousand three hundred and fifty-six items.

The donation of the Royal Hydrographic Office in London, embracing the whole collection of maps and charts of the British coast, and numbering one hundred and sixty sheets, deserves particular mention. This valuable addition to our collection was made through the instrumentality of Admiral Inglefield, of the Royal Navy.

At the request of the proper authorities the Society has under-

taken the formation of a geographical and statistical collection for the Vienna Exposition. This work has been confided to Messrs. F. A. Stout and James M. Bailey, and promises to add largely to the reputation of the Society. An interesting feature of this group will be the exhibition of several hundred photographs, illustrative of the natural scenery of the United States, and particularly of the gold and silver bearing regions of the great West.

The grateful duty devolves upon the Council to record anew its sense of the liberality of Peter Cooper, Esq., and the trustees of the Cooper Union, in providing the Society with the spacious fire-proof apartments which it has so long occupied free of cost.

Respectfully submitted.

F. A. CONKLING,
Chairman of the Council.

ANNUAL REPORT OF THE TREASURER FOR 1872.

American Geographical Society's Rooms,
Cooper Institute, New York, *Jan. 28th*, 1873.

The treasurer respectfully submits the following annual report, for the period from January 30th, 1872, to January 28th, 1873, of the receipts and disbursements of the Society:

Receipts.

Balance from last year		$130 89
Returned bill of last year		16 96
Thirteen life memberships, at $50		650 00
Initiation fees from forty-five resident members, at $10,		450 00
Annual dues for 1870	$15 00	
Annual dues for 1871	75 00	
Annual dues for 1872	1,372 50	
		1,462 50
Special subscriptions		1,550 00
Which, with the balance at the end of last year, makes a total of		$4,260 35

the whole collection of the charts of the British coast, numbering one hundred and sixty sheets, was presented to the Society.

The names of all the other donors, institutions, and societies that have contributed to the library and map-room of the Society will appear in the printed list attached to the librarian's annual report.

Respectfully submitted.

ELIAL F. HALL,
Librarian.

REPORT OF THE SPECIAL COMMITTEE TO NOMINATE OFFICERS FOR THE YEAR 1873.

AMERICAN GEOGRAPHICAL SOCIETY,
NEW YORK, *Jan. 22d*, 1873.

The undersigned, a special committee appointed at the last monthly meeting of this Society, on the 17th of December, 1872, for the purpose of preparing nominations for the election of officers on the 28th of January, 1873, respectfully report that they would recommend the names of the following gentlemen to be elected as officers of the Society for the year 1873:

President—CHARLES P. DALY, LL. D.

Vice-Presidents—F. A. CONKLING, FRANCIS A. STOUT, T. BAILEY MYERS.

Foreign Corresponding Secretary—JAS. MUHLENBERG BAILEY.

Domestic Corresponding Secretary—W. H. H. MOORE.

Recording Secretary—E. R. STRAZNICKY, M. D., Ph. D.

Treasurer—HENRY CLEWS.

Council—WM. REMSEN, W. T. BLODGETT, W. E. CURTIS, THEO. W. DWIGHT, LL. D.; GEO. W. CULLUM, U. S. A.; GEO. CABOT WARD, ELIAL F. HALL, THEODORE ROOSEVELT, WM. JONES HOPPIN.

Respectfully submitted.

J. W. RICHARDS, *Chairman.*
SAMUEL D. TILLMAN.
HORATIO M. ALLEN.

ANNUAL REPORT OF THE LIBRARIAN FOR 1872.

ROOMS OF THE AMERICAN GEOGRAPHICAL SOCIETY, COOPER INSTITUTE,
NEW YORK, *Jan. 28th*, 1873.

In accordance with the existing by-laws, the librarian respectfully presents the following report for the period commencing with the 30th January, 1872, and ending on the 31st December, 1872. The book of donations shows that during that period five hundred and eighty-one entries have been made, and that they are of the following description:

Volumes — Folios	7	
" Quartos	17	
" Octavos	220	
" Duodecimos	9	
Pamphlets — Quartos	114	
" Octavos	708	
Maps and sheets	167	
Total by donation		1,242

The book in which the purchases are recorded shows that thirty-four entries have been made, and these comprise the following:

Volumes — Folios	38	
" Quartos	0	
" Octavos	50	
" Duodecimos	0	
Pamphlets — Quartos	3	
" Octavos	16	
Maps and sheets	7	
Total by purchase		114
Grand total by purchase and donations		1,356

Among the donors, the Royal Hydrographical Office of the Admiralty, in London, deserves special mention. Through the kind offices of Admiral Inglefield, of the Royal British Navy,

the whole collection of the charts of the British coast, numbering one hundred and sixty sheets, was presented to the Society.

The names of all the other donors, institutions, and societies that have contributed to the library and map-room of the Society will appear in the printed list attached to the librarian's annual report.

Respectfully submitted.

ELIAL F. HALL,
Librarian.

REPORT OF THE SPECIAL COMMITTEE TO NOMINATE OFFICERS FOR THE YEAR 1873.

AMERICAN GEOGRAPHICAL SOCIETY,
NEW YORK, *Jan. 22d*, 1873.

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Recording Secretary—E. R. STRAZNICKY, M. D., Ph. D.

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Respectfully submitted.

J. W. RICHARDS, *Chairman.*
SAMUEL D. TILLMAN.
HORATIO M. ALLEN.

APPENDIX

TO THE

ANNUAL REPORT OF THE LIBRARIAN FOR 1872.

Alphabetical List of Donors to the Library and Map-room of the American Geographical Society.

INDIVIDUALS.

Bailey, James Muhlenberg.....New York.
Barnard, Major-General J. G., U. S. A.....New York.
Bell, Hon. Isaac, Com'r of Charities and Correction, New York.
Bradford, William, Esq.....New York.

Coffin, Prof. J. H. C., U. S. N., Superintendent American Ephemeris and Nautical Almanac.....Washington, D. C.

Daly, Chief-Justice Charles P., LL. D.....New York.
Dana, William B., Esq.....New York.
De Costa, Rev. B. F.....New York.
Disturnell, Rev. B. F.....New York.
Draper, Daniel, Esq., Director Meteorological Observatory at Central Park.....New York.
Drowne, Henry T., Esq.....New York.

Garcia, His Excellency Manuel R., Minister Plenipotentiary and Envoy Extraordinary of the Argentine Republic, Washington, D. C.

Hancock, William Neilson, LL. D., Secretary of the Statistical and Social Science Inquiry Society of Ireland.....Dublin.
Harbaugh, Hon. S. G., State Librarian.....Columbus, O.
Henry, Prof. Joseph, LL. D., Secretary of the Smithsonian Institution.....Washington, D. C.
Humphreys, Brigadier-General, U. S. A., Chief of Engineers, Washington, D. C.

Rothrock, of Wilkesbarre, Pa., who read a paper on "Our North-west: its Resources and its Inhabitants."

After the conclusion of the paper, and on motion of the Hon. Hiram Barney, seconded by Mr. Stout, the thanks of the Society were presented to Dr. Rothrock for his very interesting and instructive paper, and a copy of it was requested for publication in the Journal.

On motion the meeting then adjourned.

Annual meeting of the American Geographical Society, Cooper Institute, New York, January 28th, 1873. In the absence of Chief-Justice Daly, the president, Col. CONKLING, one of the vice-presidents, occupied the chair.

The minutes of the last meeting, December 17th, 1872, were read and approved.

Col. Conkling, as chairman, presented the annual report of the Council, which on motion was accepted and ordered to be placed on file.

Mr. Henry Clews, the treasurer, read his annual report, exhibiting a cash balance in the treasury of $58.05, and stating that the Society is now entirely out of debt.

On motion the treasurer's report was accepted and ordered to be placed on file.

Mr. Elial F. Hall, the librarian, read his annual report, showing that during the past year one thousand three hundred and fifty-six items had been added to the Society's library and map-room.

On motion the librarian's report was accepted and ordered to be placed on file.

Col. Conkling, as chairman of the Council, then reported the names of the following candidates as having been approved for election as a

Resident Member—John J. Casey;

And by Mr. Francis A. Stout, as a

Corresponding Member—General Thomas B. Van Buren, U. S. Commissioner-General to the Vienna Exposition.

And by Mr. Robert Dodge, as a

Corresponding Member — Dr. J. T. Rothrock, Wilkesbarre, Pa.

No ballot being called for, on motion these gentlemen were declared duly elected resident and corresponding members.

The recording secretary then read the amendments to the by-laws of the Society as proposed at the last monthly meeting, on December 17th, 1872.

On motion these amendments were accepted, and the by-laws so amended declared to be in force.

Dr. Richards, as chairman of the Nominating Committee, then reported that the names of the following gentlemen are recommended for election, as officers of the Society, for the ensuing year:

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Vice-Presidents — F. A. CONKLING, FRANCIS A. STOUT, T. BAILEY MYERS.

Foreign Corresponding Secretary — JAS. MUHLENBERG BAILEY.

Domestic Corresponding Secretary — W. H. H. MOORE.

Recording Secretary — E. R. STRAZNICKY, M. D., Ph. D.

Treasurer — HENRY CLEWS.

Council — WM. REMSEN, W. T. BLODGETT, W. E. CURTIS, THEO. W. DWIGHT, LL. D.; GEO. W. CULLUM, U. S. A.; GEO. CABOT WARD, ELIAL F. HALL, THEODORE ROOSEVELT, WM. JONES HOPPIN.

The president then appointed Messrs. John W. Hamersly and Clinton Gilbert as tellers, who reported that the names of the gentlemen as recommended on the ticket were unanimously elected.

On motion they were then declared duly elected officers of the Society for the year 1873.

The president then introduced to the Society Dr. Augustus Le Plongeon, who read a paper on "The Coincidences

between the Monuments of Ancient America and those of Assyria and Egypt."

After the conclusion of the paper, and on motion of Dr. Richards, the thanks of the Society were presented to Dr. Le Plongeon, and a copy was requested for the archives of the Society.

On motion the meeting then adjourned.

E. R. STRAZNICKY,
Recording Secretary.

ANNUAL REPORT OF THE COUNCIL FOR 1872.

ROOMS OF THE AMERICAN GEOGRAPHICAL SOCIETY, COOPER INSTITUTE,
NEW YORK, *Jan. 28th*, 1873.

Since the date of the last annual report eight stated meetings of the Council and seven meetings of the Society have been held, and one public reception has been given in the large hall of the Cooper Union.

At the last annual meeting, which was held on the 30th of January, 1872, the present board of officers was elected. Professor D. C. Gilman, then of the Sheffield Scientific School of Yale College, now the president of the University of California, delivered the annual address, selecting as his subject "American Contributions to Geographical Science during the Last Year."

On February 20th ensuing, Prof. Wm. Newcomb, of Cornell University, read a paper on "Hispaniola: its Past, Present, and Future."

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On November 26th, a reception was given by the Society to Mr. Henry M. Stanley, the discoverer of Livingstone.

the whole collection of the charts of the British coast, numbering one hundred and sixty sheets, was presented to the Society.

The names of all the other donors, institutions, and societies that have contributed to the library and map-room of the Society will appear in the printed list attached to the librarian's annual report.

Respectfully submitted.

ELIAL F. HALL,
Librarian.

REPORT OF THE SPECIAL COMMITTEE TO NOMINATE OFFICERS FOR THE YEAR 1873.

AMERICAN GEOGRAPHICAL SOCIETY,
NEW YORK, *Jan. 22d*, 1873.

The undersigned, a special committee appointed at the last monthly meeting of this Society, on the 17th of December, 1872, for the purpose of preparing nominations for the election of officers on the 28th of January, 1873, respectfully report that they would recommend the names of the following gentlemen to be elected as officers of the Society for the year 1873:

President—CHARLES P. DALY, LL. D.

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Respectfully submitted.

J. W. RICHARDS, *Chairman.*
SAMUEL D. TILLMAN.
HORATIO M. ALLEN.

APPENDIX

TO THE

ANNUAL REPORT OF THE LIBRARIAN FOR 1872.

Alphabetical List of Donors to the Library and Map-room of the American Geographical Society.

INDIVIDUALS.

Bailey, James Muhlenberg.....New York.
Barnard, Major-General J. G., U. S. A.....New York.
Bell, Hon. Isaac, Com'r of Charities and Correction, New York.
Bradford, William, Esq.....New York.

Coffin, Prof. J. H. C., U. S. N., Superintendent American Ephemeris and Nautical Almanac.....Washington, D. C.

Daly, Chief-Justice Charles P., LL. D.....New York.
Dana, William B., Esq.....New York.
De Costa, Rev. B. F.....New York.
Disturnell, Rev. B. F.....New York.
Draper, Daniel, Esq., Director Meteorological Observatory at Central Park.....New York.
Drowne, Henry T., Esq.....New York.

Garcia, His Excellency Manuel R., Minister Plenipotentiary and Envoy Extraordinary of the Argentine Republic, Washington, D. C.

Hancock, William Neilson, LL. D., Secretary of the Statistical and Social Science Inquiry Society of Ireland .....Dublin.
Harbaugh, Hon. S. G., State Librarian .....Columbus, O.
Henry, Prof. Joseph, LL. D., Secretary of the Smithsonian Institution .....Washington, D. C.
Humphreys, Brigadier-General, U. S. A., Chief of Engineers, Washington, D. C.

Inglefield, Rear Admiral, R. N. ..... London, England.

Jarvis, Edward, M. D., LL. D. ..... Dorchester, Mass.

Körösi, Josef, Director of the Statistical Bureau of the Free City of ..... Pesth.

Lyman, Benj. S., Esq. ..... Philadelphia, Pa.

Markham, Clements R., C. B. ..... London, England.
Meyer, Gen. A. J., U.S.A., Chief Signal Officer, Washington, D. C.
Miller, George W., Esq., Sup't Insurance Dep't... Albany, N. Y.

Naphegyi, Dr. G ..... New York.
Negri, Comm. Cristoforo ..... Florence, Italy.
Newberry, Prof. John S., M. D ..... New York.
Nichols, Hon. George, Secretary of State of Vermont, Montpelier.

O'Rielly, Henry ..... New York.

Petermann, Dr. Aug. ..... Gotha, Germany.
Potter, Hon. Clarkson N., M. C. ..... New York.
Prime, Rev. S. I., D. D. ..... New York.

Randall, Stephen, Esq. ..... Providence, R. I.
Raymond, Capt. C. W., U. S. A. ..... Willett's Point, L. I.
Rösing, Johannes, Consul-General of German Empire, New York.
Rousseau, G. H., Esq. ..... New York.

Sands, Rear Admiral B. F., U. S. N., Superintendent U. S. Naval Observatory at ..... Washington, D. C.
Selwin, A. R. C., F. G. S., Director of the Geological Survey of Canada ..... Ottawa.
Slocum, Hon. H. W., M. C. ..... Washington, D. C.
Squier, Hon. E. George ..... New York.
Stevens, Simon, Esq. ..... New York.
Stout, Francis, Esq ..... New York.
Strazniecky, E. R., M. D., Ph. D., Sup't Astor Library, New York.

Todd, Hon. A. ..... Ottawa, Canada.

Van Benthuysen, C., Esq.....Albany, N. Y.

Walker, Hon. F. A., Sup't Ninth Census U. S., Washington, D. C.
Westermann, B., Esq.....New York.
Wilson, George, Esq., Secretary Chamber of Commerce of New York.....New York.
Wood, Hon. F., M. C.....New York.
Wyman, Capt. R. H., U. S. N., Hydrographer, Bureau of Navigation at .....Washington, D. C.

Zach, Wm., Esq., Acting Consul-General of the German Empire at.....New York.

Institutions.

Academy of Natural Sciences, Philadelphia, Pa.
American Antiquarian Society, Worcester, Mass.

Bombay Geographical Society.
Bureau of Statistics for the City of Prague.

Central Scientific Bureau of the Netherlands at Haarlem.
Cornell University, Ithaca, N. Y.

Essex Institute, Salem, Mass.

Ferdinandeum in Innspruck.

Geographical Society, Geneva, Switzerland.
Geographical Society, Paris, France.
Grand-Ducal Statistical Bureau for Hesse-Darmstadt, Darmstadt.

Hungarian Academy of Sciences in Pesth.
Hydrographic Office of the Admiralty in London.

Imperial Academy of Sciences, Vienna, Austria.
Imperial Academy of Sciences, St. Petersburg, Russia.
Imperial Geographical Society in Vienna, Austria.
Imperial Prussian Statistical Bureau, Berlin.
Iowa State Historical Society, Iowa City.
Italian Geographical Society, Florence.

Kais.-König. Geologische Reichsanstalt, Wien.

Lyceum of Natural History, New York.

Mexican Geographical and Statistical Society, Mexico.

New York Association for Improving the Condition of the Poor, New York.
New York State Library, Albany.

Peabody Academy of Science, Salem, Mass.
Pulkowa Observatory.

Royal Academy of Sciences, Brussels, Belgium.
Royal Cornwall Polytechnic Society, Cornwall, England.
Royal Danish Society of Sciences, Copenhagen.
Royal Danish University, Lund, Sweden.
Royal Geographical Society, London.
Royal Societies of Sciences, Upsala.
Royal Society of Sciences, Göttingen.
Royal Society, London.
Royal Statistical Bureau of Sweden, Stockholm.

Secretary of State of the Argentine Republic, Buenos Ayres.
Statistical Bureau of the Free City of Pesth.
Statistical Society, London, England.

United States Coast Survey Office, Washington, D. C.

Verein für Erdkunde, Darmstadt.
Verein für Erdkunde, Dresden.
Verein fur Geographie und Statistik, Frankort-am-Main.
Vermont State Library, Montpelier, Vt.

PART II.

PAPERS READ BEFORE THE SOCIETY.

(N. B.—The Authors are alone Responsible for the Contents of their Respective Papers.)

I.

ANNUAL ADDRESS,

By Chief-Justice Daly, the President,

Subject—THE GEOGRAPHICAL WORK OF THE WORLD IN 1872.

Delivered February 17th, 1873.

Physical Events of the Year.

The physical events of a geographical and general character which have especially marked the past year have been: The wide-spread disturbance of the earth's crust, as exhibited in volcanic action and earthquakes, atmospheric disturbances in the shape of storms, cyclones, hurricanes, and tornadoes, distinguished by their wide distribution over the earth's surface, their intensity, the frequency of their occurrence, and the great destruction of life and property that has attended them; enormous rainfalls, especially in Asia, and extensive inundations and devastating floods, from the overflow of rivers, and the action of the sea upon coasts in Europe; remarkable extremes of heat and cold in various parts of the globe, exceptional in their intensity, and the length of their duration, with all of which, perhaps, should be connected observations made during the year of additional evidences of the gradual rising and sinking of the land in different parts of the earth, as indicated by marks upon the coast-line of continents and islands.

Among the most prominent of these physical events, I may name the earthquake in California in March last, which extended over 1,500 miles of territory, and during the three days of the continuance of which it is said seven thousand shocks were felt. The earthquake in the unfortunate city of Antioch, in Syria, involving the loss of two thousand lives; the occurrence, ten days after, of violent shocks at Accra, on the Gold Coast of Africa, contemporaneous with which was the great hurricane that destroyed every vessel but one in the harbor of Zanzibar; and earthquakes, more or less severe in their effects, in New Zealand, in Java, in the Philippine Isles, at Shemacha in the Caucasus, in England, Scotland, and other places in Europe, at Valparaiso, Hawaii in the Sandwich Islands, Oaxaca in Mexico, in Tennessee, Iowa, Dakota, on the North-east coast of America, over the New England States, and as far north as Quebec; and submerged earthquakes upon our Western lakes.

The continuous passage, from February to May last, of immense ice fields along the coast of Newfoundland, from Baffin's Bay and Smith's Sound; the eruption at Mount Vesuvius, last April, the most terrible known for centuries; the great February storm in the North-west of the United States, during which eight hundred railroad cars were blocked and numerous lives lost; the remarkable snow drifts in Nova Scotia, thirty feet high; the tornado in Ohio, blowing down one hundred and sixty houses; and the great gales involving an extensive loss of property on our Western lakes; the immense rainfall in Bombay; the violent cyclone in the harbor of Madras; the terrific gales and hurricanes on the Baltic and North Sea, by which one thousand miles of land were flooded, the water rising higher than had ever before been known; the inundation of the River Po, covering four hundred square miles and rendering sixty thousand persons homeless; the inundations of the Rhine, the Seine, and the Loire, and toward the close of the year, the ten days'

storm, hurricane, and floods in England, and the extraordinary whirlwind in Ireland; the intense cold in the beginning of the year, by which many persons in our Northwestern States perished; the excessive heat during the months of May, June, July, and August; the phenomena of extraordinary electrical convulsions throughout the United States, during this heated period, and the appearance of huge sun-spots, which were discovered and seen for many days toward the close of July; the excessive cold of the present winter, one of the accompaniments of which has been the terrific snow-storm that recently overspread the State of Minnesota, during which hundreds of persons exposed to it, and unable to escape, were frozen to death; to which enumeration, by no means a full one, I may add the terrible earthquake which occurred a few weeks ago at Somghee, in India, a town 114 miles north of Bombay, involving the loss of 1,500 lives.

The occurrence of physical events of this character, so wide-spread and so numerous, within the limited period of a single year, adds weight to the theory maintained by Lyell and other geologists, that causes now in operation, and which may have been acting over long periods of time, are adequate to account for all the disturbance and changes that have taken place upon the earth's surface.

American Explorations and Surveys.

In the general survey of the geographical work accomplished during the past year, I will first call attention to what has been done in our own country. It comprises the various labors of the Coast Survey, under the admirable superintendence of Prof. Peirce; of the Engineer Corps of the U. S. Army, under the direction of its accomplished chief, Brig.-Gen. A. A. Humphreys, whose report for the year is one of unusual extent and exceeding interest; the explorations in the Territories of Utah, Idaho, and Montana, under the direction of Prof. F. V. Hayden, the chief of the Geological Survey of the United

States Territories; the continuation of the survey of the fortieth parallel, under Mr. Clarence King; the explorations west of the hundredth meridian, under Lieutenant George M. Wheeler, of the Engineer Corps; a reconnoissance of the basin of the Upper Yellowstone River, in Wyoming and Montana Territories, embracing the head-waters and sources of that river, by Capt. J. W. Barlow, assisted by Capt. D. P. Heap, of the Corps of U. S. Engineers; explorations and surveys in the Uintah Mountains in Utah, by Capt. W. A. Jones, of the same corps; the determination of the difference of longitude between Detroit, Mich., and Fort Leavenworth in Kansas, by Lieut. E. H. Ruffner, likewise of the same corps; and the reconnoissance and cartographical labors, under the direction of that officer, for a series of maps on the scale of an inch to four miles, embracing Kansas, west of the sixth principal meridian, Colorado as surveyed, the Indian Territory, Chickasaw Nation, and a part of New Mexico; the continuation of Prof. Powell's exploration of the Colorado River and its vicinity, and the exploration by his associate, Prof. Thompson, of the region north toward the Wahsatch Mountains; the exploration and scientific investigation, by W. H. Dall, Esq., upon the geography, hydrography, and natural productions of the Aleutian Islands, and their vicinity; the surveys, explorations, and reconnoissances in connection with the building of the North Pacific Railroad from the head of Lake Superior to Puget Sound, under the Chief Engineer, Gen. W. Milnor Roberts; the meteorological observations of the Signal Service Bureau of the War Department, under Brig.-Gen. A. J. Myer; the completion of the scientific voyage of the "Hassler" around the Continent of South America, organized by the Coast Survey for the more particular observation of the coast lines of South America, for deep-sea dredging throughout the voyage, and the making of Zoölogical and other collections in natural history, to which should be added the

continuation of the geological surveys of the States of New Hampshire, New Jersey, Ohio, Michigan, Indiana, Illinois, Louisiana, and California, embracing an amount of work, which, in extent and value, will compare with that of any previous year.

Before proceeding to give a brief account of the nature of these respective labors, I must express my acknowledgments, particularly to Prof. Hayden, Lieut. Wheeler, Gen. W. Milnor Roberts and E. R. Esterbrook, Esq., of the Signal Service, all of whom have most kindly, upon request, furnished me with the latest information in their respective departments.

Coast Survey.

The year was unfavorable for surveying operations along our coast; but the labors of the Coast Survey have been in other respects active and important. They have embraced the scientific voyage of the steamer "Hassler" around the Continent of South America, which was organized for the more particular observation of the coast-lines of that continent, for deep-sea dredging throughout the course of the voyage, and for the making of zoölogical and other collections in natural history. The temporary occupation of points upon the Rocky Mountains for scientific purposes; an expedition for the more exact determination of the difference of longitude between Washington and Greenwich, which, under the direction of Prof. J. E. Hilgard, was brought to a successful conclusion last September; the continuation of the survey of the harbor of New York, in which considerable progress was made during the year, and observations relating to the hydrography of the Gulf of Mexico.

Voyage of the "Hassler."

The voyage of the "Hassler" lasted nine months. The chief scientific result has been the observation by Prof. Agassiz of the evidence of post-glacial action on the coast of South America, both on the Atlantic and the Pacific

side, below the thirty-seventh parallel of south latitude, with the detection of existing glaciers in the Straits of Magellan and on the coast of Chili, and an immense zoölogical collection, embracing 100,000 specimens, the fish in which alone amount to 30,000. The deep-sea dredging, a very important object, was not pursued to any extent, from some defect in the apparatus or other cause.

Agassiz found a strong resemblance between many parts visited and regions of the Alps with which he is familiar, which resemblance, he says, is not superficial, but extends to the geological structure of the whole region. What he saw, he says, was the evidence of glacial action, or, as he expresses it, terrestrial masses of ice moving upon the solid ground, and not icebergs, which as floating bodies could not have produced the abrasion which he saw; the planing, grooving, and furrowing of the rocks. He found the country presenting a glacial-worn aspect as far north as the Gulf of Peñas, in Chili. His conclusion from what he saw was that during the glacial period both hemispheres must have each been capped with an enormous sheet of ice, one moving northwardly from the Atlantic, and the other southwardly from the Arctic toward the equator. He says, from what he saw in South America, he is convinced that ice has been the great paring machine by which the rocky surfaces of the globe have been fashioned, and that the great geological agents have not alone been fire and water, but that ice has had a great share in moulding the earth's surface. The professor says that he knows that his observations will be questioned, and adds, pleasantly: "An old hunter does not take the track of a fox for that of a wolf; and I, an old hunter of glacial tracks, know their foot-prints when I find them." I should perhaps here mention that Prof. Hartt, who accompanied Agassiz in the exploration of the Amazon, in a paper read before this Society during the year, pointed out mistakes which the professor had made in

the observation in South America of what he supposed to be the result of glacial action; and that eminent geologists, such as Lyell, Dawson, Dr. Sterry Hunt, and Home, do not admit that there ever was such a glacial period as Agassiz believes to have existed, or anything at any time but glaciers in particular localities; and the opinion of these geologists has been somewhat strengthened by recent observations of M. C. Grad in North Africa, especially in the Atlas range and in the Desert of Sahara. On the other hand, Lieut.-Col. Drayson, R. A., has just published a work in which he gives not only a formidable array of evidence in proof of a glacial epoch, but assumes it to be a necessary consequence of the change which takes place in the direction of the earth's axis, whereby the whole earth is affected. This change, Col. Drayson argues, would, in about 16,000 years, cause a decrease in the obliquity of thirty-five degrees, which, he says, would bring about climatic changes quite sufficient to produce Agassiz's glacial epoch.

Surveys and Exploration of the United States Engineer Corps.

The labors of the Engineer Corps during the past year have been very extensive in the geographical work of the improvement of harbors and rivers, a matter of the highest importance and value in our country, so large a portion of which is as yet but partially developed. The survey of our great lakes by the corps has also been carried on; that of Lake Superior being completed, and that of Lake Michigan carried so far that it will probably be completed in another season. With this work have also been connected astronomical and meteorological observations, and lake-surface observations, extending over the entire lake region.

Prof. Hayden's Exploration in Utah, Idaho, and Montana Territories.

The result of Prof. Hayden's expedition during the

year in Utah, Idaho, and Montana, I prefer to give in the language of the communication he has courteously sent me:

"The report of the exploration of the valley of the Upper Yellowstone, and the head-waters of the Madison, during the season of 1871, by the U. S. Geological Survey of the Territories, created such an interest in the public mind all over the country that Congress was led thereby to pass a law forever withdrawing from the public lands intended for sale, or occupancy by settlers, a tract comprising 3,575 square miles. This reservation was called the Yellowstone National Park, and was intended to preserve and protect the wonderful curiosities of nature within its borders for the benefit and instruction of the people. To complete this exploration, so successfully commenced, a second expedition was made into that region during the past summer (1872). The appropriation for the survey by Congress, during the session of 1871-72, was so liberal that the geologist in charge was enabled to organize two separate parties. To each of these parties there were attached a geologist, an astronomer, topographer, and meteorologist, with the necessary assistants for each. One of the parties, under the immediate direction of Mr. James Stevenson, surveyed a route from Ogden, Utah, to Fort Hall, Idaho Territory, where full preparations were made for a pack-train with supplies to proceed up Snake River. The party passed up the west side of Snake River valley, making a careful, detailed survey of all the branches of that stream, located the Great Teton range, and then passed up the valley of Henry's Fork, and entered the Madison Valley through the Targee Pass, and reached the Geyser Basin, August 14.

"The second party, under the direction of Prof. Hayden, proceeded to Bozeman, Montana, in the valley of the Gallatin, and made that its point of departure. The valleys of the Yellowstone, Madison, and Gallatin, with

their numerous branches, were all carefully examined, and the materials secured for a map of the country in contour lines of one hundred feet each.

"The event of the season was the ascent of the Grand Teton. There is no tradition that any white man has ever reached its summit. A party of thirteen began the ascent; but only two succeeded, Mr. Stevenson and Mr. Langford. They found upon the summit a rude structure, which appeared to be an inclosure, and which must have been built several hundred years since, and is supposed to have been used as a protection from the wind.

"The elevation of the Grand Teton was found to be 13,762 feet above the sea, thus making it one of the monarch peaks of our continent.

"The examination of the four remarkable passes at the head of Henry's Fork was another of the interesting and important results of this Survey. Here are four passes across the water-shed of the continent, connecting the Atlantic with the Pacific Slope. These passes represent the four points of the compass. The Targee, or East Pass, is 7,063 feet above the sea, and opens into the Upper Madison, forming the most important gateway to the Yellowstone National Park. The Madison, or North Pass, leads into the Lower Madison Basin, thus connecting the North-west with the great interior basin of Utah, as well as the Pacific Slope. The Red Rock Pass, with an elevation of 7,271 feet, leads to the valley of Jefferson Fork, and thus to any portion of Montana. Henry's Lake, which gives origin to Henry's Fork, is located in the centre of these passes, and has an elevation of 6,443 feet.

"This wonderful region, which seems to form the apex of the continent, was carefully explored and mapped. Here, within a radius of fifty miles, the snows that fall upon the mountain-tops give origin to the largest rivers on our continent, forming one of the most remarkable water-sheds, in a geographical point of view, in the

world. On the north side are the sources of the Yellowstone; on the west, those of the Three Forks of the Missouri; on the south-west and south, those of the Snake River, flowing into the Columbia, and thence into the Pacific; and those of the Green River, flowing southward to join the Great Colorado, and finally emptying into the Gulf of California; while on the east side are the numerous sources of Wind River. We thus see that this water-shed gives origin to three of the largest rivers in North America—the Missouri, Columbia, and Colorado. The general elevation of this portion is from 7,000 to 8,000 feet; while the mountain-peaks, which are very numerous, average from 9,500 to 11,000 feet. From one lofty peak at the source of Snake River 470 mountain-peaks were counted within the circle of vision.

"About the sources of Snake River it was found that the existing maps were quite incorrect. Madison Lake, which was previously supposed to be the source of Madison River, was found to give origin to Snake River. It is a beautiful body of water, about eight miles wide and twelve miles long. From it flows a stream about one hundred feet wide, which, after flowing a distance of five miles, empties into another lake, about four miles long and one and a half miles wide. The first of these was called Lake Shoshonee, and the latter Lake Lewis, in honor of the great explorer of the North-west.

"At the upper end of Lake Shoshonee a new geyser basin was discovered, containing over one hundred springs, several of which ranked with first-class geysers. The ornamentation about these springs is peculiar, and even more beautiful than that around the springs in the geyser basins on the Madison.

"Careful observations were made by both parties for latitude and longitude at every available point, and several localities, as Fort Hall, Virginia City, Fort Ellis, and Helena, were fixed with a good degree of precision.

"Six of Green's best cistern barometers, and a dozen

aneroids, were in constant use. The observations and collections in geology, mineralogy, botany, and the various departments of natural history, far exceeded those of any previous year.

"Besides the two principal parties mentioned above, five small parties have been operating in different parts of the West, under the auspices of the Survey, with great success. Prof. Joseph Leidy spent about two months examining the ancient lake basins of Wyoming for vertebrate remains, and Prof. E. D. Cope occupied most of the season in various parts of the West, making most important discoveries.

"The relations of the great Cretaceous and Tertiary groups of the West to each other have become a question of the highest interest; and Mr. F. B. Meek, the distinguished paleontologist, spent the summer along the line of the Pacific Railroad, studying these formations and collecting the evidence from invertebrate fossils; while Prof. Leo Lesquereux, our great authority on fossil botany, took up the coal groups in the West, and made the plants a subject of special investigation; and Prof. Cyrus Thomas devoted the summer to the agricultural resources of the North-west.

"All these gentlemen are now busily engaged in preparing their reports for publication by Congress."

Survey of the Fortieth Parallel.

The geological and topographical exploration of the territory between the Sierra Nevada and the Rocky Mountains, under Mr. Clarence King, has, during the year, embraced the completion of the field-work of the geological exploration of the fortieth parallel; an illustrative series of the studies of the geology and topograpy of the extinct volcanoes, and further studies in glacial action. A third volume of this most interesting survey is now in the course of publication by the Government.

LIEUT. WHEELER'S EXPEDITION IN NEVADA, UTAH, AND ARIZONA.

From notes kindly furnished me by Lieut. Wheeler, I am enabled to give the result of the year's work of the expedition under his charge. There have been three seasons of field-work in 1869, 1871, and 1872; the areas embraced being Eastern California, nearly the entire part of Nevada south of the fortieth parallel, Western and Southern Utah, and Northern and Western Arizona. Some idea of the vastness of this field of exploration may be inferred from the fact that these surveys covered a belt of country equal in area to the whole of the New England and the Middle States, and that the reconnoissance lines of these surveys reach, at the least, fifteen thousand miles. They have been made in conformity with an act of Congress, the object of which is to establish an astronomical base, and the continuance of military and geographical surveys and explorations West of the hundredth meridian. Before the passage of this act, a comprehensive plan of surveys was submitted to the Engineer Department, which was ratified and adopted as the basis on which future surveys by Lieut. Wheeler should be made. The plan was, briefly, to divide the territory lying west of the hundredth meridian into eighty-five equal rectangles, and to work up each of them with rigorous exactness, and publish the results from time to time, in connection with an index-map of the whole area embraced, each small map being thrown up to ten times the size in the index-map, so that, by turning from one to the other, a complete knowledge of the country in its relative and detailed character can be obtained. The "importance," says Lieut. Wheeler in the communication he has sent me, "of accurate and frequent maps in connection with Western surveys has long been apparent to my mind, not only for their obvious convenience as maps of reference for the traveller and the emigrant, but as being the essential ground-work on which all explorations and

investigations should rest, and to which the after-labors of the geologist, the miner, and the capitalist should be referred." In connection with the perfected Engineers' map, a series of maps or charts might easily, he says, be arranged, covering a variety of topics, and exhibiting an epitome of all researches and scientific observations in the regions embraced. "In which service," he continues, "I may mention an historical map on which, with appropriate markings and colorings, the lines of the earliest explorers, and the area of each and every survey that has been prosecuted, should be carefully designated; a map of climatology, covering a multitude of features; an agricultural map, showing the lines of demarcation between different belts of country in their adaptability to cereals and fruit; a mineralogical map, necessarily fluctuating in accuracy and completeness, detailing the most recent and well-established specifications in regard to mining areas, either by itself, or in connection with the agricultural map; a map of mountain, desert, and arable land, with diagrammatic exhibition of areas where irrigation and Artesian wells are necessary and considered practicable; and so on, through quite an extended series. The amount of information which would be easily imparted by such a system of charts, and which could be extended at will to cover an increased variety of topics, would be very great."

As an important factor in the accurate making of maps, "astronomical observations," he writes, "have been employed to a large extent, and I am happy to state that I have been enabled to collect a measurably complete and valuable set of observations from a corps of trained assistants, stationed not only at different points in the territory surveyed, but at more distant points, such as Cheyenne, Fort Steele, and Green River Station on the Union Pacific road, from which communication was established with the main observatory in Salt Lake City,

the Mormon observatory at the latter place being placed at my disposal by Brigham Young."

"The importance of these observations," he says, "in perfecting a survey, where so many physical obstacles prevent accurate geodetic work, can hardly be overestimated. Whilst regarding map-work as the first in the line of the surveyors' and explorers' work, and as the basis for all that accompanies it, I have not allowed the various departments of meteorology, geology, natural history, mining, and other industries to be dwarfed in importance or restricted in action. Besides constant and valuable work in all these departments, much attention has been given to numerous allied topics, such as irrigation, routes for roads and railways, and the needs and possibilities of the different regions traversed. An attempt has thus been made, as should always be the case, to connect the work of the survey with the industrial interests and special development of the Western country, where science, pure and simple, can hardly be expected to take root as yet, but should go hand-in-hand with practical utility and the needs of the peculiar stage of development of the civilization which covers it."

The main office-work of the expedition is at present concentrated on the preparation of the five volumes which are to cover the season's field labors. These volumes are to be condensed to the greatest brevity possible, without the sacrifice of valuable material, and will comprise about one hundred and seventy-five pages quarto each, if possible. The result of the season will be segregated into appropriate departments, and the volume issued accordingly. The greater part of the thirteen of the projected eighty-five rectangles are in process of compilation, five having been added during the last year, and their publication in map-form, with an index-map, will be made as speedily as the careful mechanical execution of the work can be effected.

Capt. Barlow's Expedition to the Source of the Yellowstone River.

The reconnoissance of Captain Barlow has been in the basin of the Upper Yellowstone River, and was made in the months of July and August, 1871, for the purpose of examining the source of the Yellowstone; the result of which, in the form of an official report, was laid before Congress last April by the Secretary of War. The report is one of exceeding interest, giving a detailed description of the region traversed, being in part over the same field of operations covered by the geological expedition of Prof. Hayden. It embraces the general geography of the region, the mountain forms, the peaks and heights, the streams that connect with the Yellowstone, the waterfalls and cañons; an elaborate description of the basin of the Great Geyser, or hot spring, "a thorough solution of the wonders of which," says Capt. Barlow, "is to be attained only by long and patient observation by a corps of observers at different points;" the thermal springs; the calcareous deposit known as Soda Mountain; the mud volcanoes and the lakes which are tributary to Snake River. From the summit of a mountain 10,400 feet above the level of the sea, which Captain Barlow named Mount Hancock, he and his party obtained what he calls an unparalleled view of a vast extent of country, bounded by the Gallatin Mountain and Elephant's Back on the north, the Yellowstone range on the east, the Wind River range on the south, and the Great Teton range on the west. To the report is attached a most valuable map of the region traversed, delineating the curvatures of the mountain forms, the position and shape of the Yellowstone Lake, and the course of the great cañon of the Yellowstone. The meteorological records and the numerous and interesting specimens collected in this reconnoissance were unfortunately destroyed by the great fire in Chicago.

CAPT. JONES'S EXPLORATION IN THE UINTAH MOUNTAINS.

The exploration and surveys of Capt. W. A. Jones have been in the Uintah Mountains in Utah; the Uintah range is a spur of the Wahsatch Mountains, beginning in lat. 40° 30′ N., with an altitude of about 12,500 feet, and thence tending north-easterly to Green River, where the spur terminates. The extreme elevation of the range is in the vicinity of Gilbert's Peak, where the mountains reach to about 13,500 feet, and the whole region is one hitherto comparatively unknown. The object of this expedition was to ascertain the character and extent of the valleys through which the streams run flowing from these mountains; the nature of the timber, and the adaptability of the valleys for cultivation and settlement, and especially the examination of the country in the vicinity of Green River, with reference to the supposed existence there of large mineral deposits. He found the mountain-slopes covered with extensive forests of young growth, showing that extensive fires have ranged there for long intervals. The valleys were numerous, deep, and narrow, extending quite to the summit. The enormous basins that range along either side of the summit-line, he thought, from their position, must be filled in the winter with great drifts of snow, furnishing in the summer a continuous supply of water to the numerous mountain-streams. The whole region, mountain and plateau, he says, is especially adapted for grazing, grass being found everywhere, even to the mountain-summit; and, as there is always water, he thinks that a pastoral people could live quite comfortably in these mountain-valleys. He speaks highly of the region watered by the North Uintah River, having everywhere a superabundance of grass, wood and water, and a climate incomparably fine. The mineral deposits were found to be unimportant, and a noticeable feature of the whole region was the scarcity of birds, reptiles, and insects.

Prof. Powell's Exploration of the Colorado River.

Prof. J. W. Powell has, during the year, continued his survey of the Colorado River, under the auspices of the Smithsonian Institution, and has made his second preliminary report. He has continued the examination of the wonderful series of cañons along the course of the Colorado, and has visited a group of volcanic mountains north of the Grand Cañon, to which he has given the name of the Uinkaret Mountains. The work done during the year has developed a most remarkable series of faults and folds in the earth's crust, which, in the opinion of Prof. Henry, will be of the highest interest to the geologist.

An extensive series of faults running northerly and southerly across the Grand Cañon were examined; some of them, as far as the Wahsatch Mountains. The fissures of these faults have been vents for volcanoes, and are from 50 to 200 miles in length. Discoveries were also made of coal, salt and metals. The number of the houses found of the prehistoric inhabitants of this region has, by the discoveries of this year, been increased to about one hundred; one being situated on the crater of a volcanic cone. The collection of rock-inscriptions, or picture-writing, has been much enlarged. The Seven Cities, called by the Spaniards the Province of Tusayan, were revisited for ethnological purposes, and the passage of the Grand Cañon, in boats, was again successfully accomplished, although attended, at one time, by great peril in consequence of the sudden rising of the river during the night.

Surveys for the Northern Pacific Railroad.

The Northern Pacific Railroad has, during the year, been extended from Moorhead on the Red River of the North, to the Missouri River, opposite the mouth of the Heart River, a distance of 198 miles, making, so far, a

continuous line from Duluth, at the head of Lake Superior, of 450 miles, showing the energy and celerity with which this great work has been carried on. The surveys in connection with the work have been very extensive, embracing a reconnoissance upon the Missouri River of 2,300 miles; a preliminary survey east of the Rocky Mountains of 250 miles; one of the like character in the Rocky Mountains of 700 miles, and upon the Pacific Slope and over the Cascade Mountains of 1,727 miles. There have been, east of the Rocky Mountains, amongst the mountains, and along the Pacific Slope 1,165 locations, the railroad surveys and locations amounting to 3,843 miles, or about twice the length of the main line between Lake Superior and Puget Sound. The data, from these surveys made during 1872, chiefly between latitude 45° and 49° N. will, when elaborated, add greatly to our geographical knowledge of this most important and interesting region.*

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*As this survey is one of great interest in this country the following account of it, in detail, is given, from the communication received from Gen. Roberts:

During the season of 1872, the Company extended their road across the Territory of Dakota, on a nearly east and west line, from Moorhead, on the Red River of the North, to the Missouri River opposite the mouth of Heart River, a distance of 198 miles, making a continuous line from Duluth at the head of Lake Superior, of 450 miles.

Additional surveys were made from the mouth of Heart River to the western boundary of Dakota Territory, and beyond into Montana Territory, crossing the Little Missouri River and extending to the junction of the Powder River with the Yellowstone; a distance of 250 miles. This survey was conducted in the field under the direction of D. C. Linsley, Assistant Chief Engineer, and Gen. T. L. Rosser, Division Engineer, with a Government escort under the command of Gen. Stanley, U. S. A.

A survey was also made along the Musselshell River, from a point near its great bend to its sources in the Belt range, a spur of the Rocky Mountains, and thence over by a favorable pass, and down Sixteen Mile Creek to the Missouri River, and connecting at the "Three Forks" of the Missouri with the initial point, "departure point one," a distance of 173 miles. This survey was conducted in the field by Col. John A. Haydon, Assistant Engineer, with a Government escort under the command of Col. E. M.

W. H. Dall's Explorations in the Aleutian Islands.

Mr. W. H. Dall's investigation in connection with the geography and hydrography of the Aleutian Islands has been carried on during the year under the auspices of the Coast Survey, his headquarters being at Illuluk, Oonalaska. He has discovered in these islands the remains of a people antecedent to the race that now inhabits them. Around the sites of ancient villages he found burial-caves in which the dead bodies had been placed,

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Baker, U. S. A. This survey disclosed an additional practicable railroad-line by the Sixteen-Mile Creek Pass, which connects advantageously with the several lines surveyed in 1871, across the main range of the Rocky Mountains.

A reconnoissance of the Missouri River was made during the season of 1872, extending from the proposed crossing of the Missouri at Heart River to the head of the Missouri River, at "departure point one," above mentioned, embracing about 1,300 miles—including a survey for a railroad around the Great Falls of the Missouri (21 miles). This examination also covered the reconnoissance of the River from Sioux City to Heart River. It was made for the purpose of ascertaining the character of the navigation in detail, and the work required for its improvement. It was conducted by Mr. Thos. P. Roberts, Assistant Engineer.

A survey was made on two additional routes crossing the main range of the Rocky Mountains; one by an extension of the survey of 1871, up the Wisdom River to its sources in the Bitterroot range of the Rocky Mountains, and across the summit to the head-waters of the Salmon River, and down the Salmon River to its junction with the Snake, or Lewis' Fork of the Columbia River; and thence down the Snake River to Lewiston at the mouth of the Clearwater, one of its tributaries, where it connects with the surveys of 1871. The surveys up the Wisdom River were conducted by Mr. M. T. Burgess, Assistant Engineer, and the surveys down the Salmon River were conducted by Col. W. W. de Lacy, Assistant Engineer.

The unfinished surveys on the Missoula River were resumed, and a line was located from the town of Missoula, in Montana Territory, down Clarke's Fork of the Columbia River to Lake Pend d'Oreille, a distance of 207 miles. This work was conducted by Mr. James Beltner, Assistant Engineer. A survey was also made by him from the Fishery Creek, over the Bitterroot range, down to the North Fork of Clearwater, connecting with the survey of Col. Eastwick made in 1871, from Lewiston up the North Fork.

An additional route was also traced over the main range of the Rocky Mountains in the vicinity of Mullan's Pass, passing in the vicinity of Helena,

and gayly dressed, some being encased in wooden armor. The bodies were so placed and arranged as to indicate their ordinary occupations;—men in canoes, as in the act of rowing; women dressing skins, holding children, etc., etc. This method of burying in canoes was common among the South-American Indians, but had not hitherto been known to have been practised by the North-American tribes. Mr. Dall is preparing an Arctic flora and fauna, and his forthcoming work will be of interest alike to the geographer, the archæologist, and the naturalist. This very capable and industrious young

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by Mr. T. P. Roberts, Assistant Engineer, making a shorter line than the route via Ten-Mile Pass, surveyed in 1871.

In addition to these, a large amount of surveying and location of lines was accomplished during 1872, on the Pacific Slope, westward of the region already referred to, under the immediate direction of Thomas B. Morris, Division Engineer.

A line was located along the Columbia River, by James F. McCabe, Assistant Engineer, from Kalama to the mouth of Snake River, 250 miles; another by R. A. Habersham, Assistant Engineer, from the Cascades of the Columbia to Portland, on the Willamette River, 42 miles; the track of the main line from Kalama northward toward Puget Sound was extended 40 miles, to within 15 miles of Olympia, which is at the southern extremity of the Sound; while a location was made along the eastern side of Puget Sound to Sehome, on Bellingham Bay, 232 miles from Kalama. These locations were made by R. A. Habersham and Geo. H. Birnie, Assistant Engineers.

Lines were also run from the main line to various points on Puget Sound. Preliminary surveys were made between the mouth of Snake River and Lake Pend d'Oreille, by Mr. Hubert C. Ward, Assistant Engineer. The line was afterwards located over the same general region by Col. P. G. Eastwick, Assistant Engineer.

Mr. Ward made a survey from Lake Pend d'Oreille across the Columbia Plains to the Wenatchee, and up the river to the summit of the Cascade range of mountains, where he was met by a line surveyed by Mr. J. T. Sheets, Assistant Engineer, from Puget Sound up the Skagit River. These surveys give the shortest practicable line between Lake Pend d'Oreille and Puget Sound.

Mr. Ward surveyed several passes in the Cascade range, bringing them into connection with the lines just mentioned; so that much has been added to our topographical and geographical knowledge of the Columbia plains, and of the Cascade range of mountains.

explorer has been recently engaged in hydrographic explorations in the Northern Pacific, and has just returned to San Francisco, where he is preparing the report of his latest labors for the Government.

The Hydrographic Bureau's Survey of the Northern Pacific.

An expedition has been organized by Commander Wyman, Chief of the Hydrographic Bureau of the Navy Department, for a more complete geographical exploration of the seas between our Pacific coast, China and Japan, and for the construction of more accurate charts; our increasing and important commerce in this direction demanding a more accurate survey of this part of the Pacific. An observer has been stationed during the year at St, Paul, in the Aleutian Islands, by the Signal Service Bureau, which observer, in addition to his meteorological duties, is to examine as far as possible the temperature of the sea in that vicinity, to note the tides, the passage of ice through Behring Strait, the movement and temperature of the Japanese current, if arrested and thrown upon the American coast by the blocking-up of the Strait, and to preserve specimens of the drift that may be picked up.

The Darien Expedition.

In the winter of 1870, the Government of the United States sent out an expedition, under Commander T. O. Selfridge, U. S. N., to explore the practicability of the several routes suggested for an interoceanic canal through the Isthmus of Darien. He surveyed the several proposed routes, commencing at Caledonia Bay and the Gulf of San Blas, and found them to be totally impracticable. In the winter of 1871, another expedition was sent out under the same commander, to explore the route by the Atrato and Tuyra rivers, which was done, and was likewise found impracticable. Another

route was also surveyed by the way of the Atrato and Napipi rivers. This route the exploring party were unable to examine as fully as had been desired, in consequence of the coming-on of the rainy season; but they succeeded in completing a line of survey from the Pacific to the Atrato, and the indications were so favorable that the Government sent out another expedition at the close of last year, under Commander Selfridge, to complete the survey. Commander Selfridge is to begin on the Pacific side in the Bay of Cupica, about ten miles below the former points of exploration, where he expects to find a depression. Very favorable expectations are formed in respect to the result of this survey; and if a canal by this route be practicable, and should be constructed, it would reduce the distance for sailing vessels between New York and Hong Kong from 110 to 83 days, making a difference of twenty-seven days. There is also an expedition for the survey of the Nicaragua route, under the direction of Commander Lull, U. S. N., which our member, Mr. Body, who is familiarly acquainted with the different parts of the isthmus, thinks will prove to be the most practicable. In a few months we shall have definite information in respect to both of these routes.

THE AMERICAN PALESTINE-EXPLORING EXPEDITION.

The American Palestine-Exploration Society has recently despatched an expedition to Syria, under the charge of Lieut. E. Z. Steever, of the U. S. Engineer Corps, for the exploration of the country east of the River Jordan, and of the northern part of Syria. The expedition consists of Lieut. Steever and three associates from this country, with whom will be united, in the field of exploration, a certain number of educated and trained natives of Syria, making together a very effective body for the prosecution of the geographical and archæological labors of the expedition, which will extend over a period of three years. The expedition is one of great interest to

the geographer, the Biblical scholar, and the archæologist, as the region to be explored is almost unknown, and is one to which the attention of those interested in these respective fields of inquiry has long been directed.

The Signal Service.

Nothing in the nature of scientific investigation instituted by the National Government has proved so acceptable to the people, or has been productive, in so short a time, of such important results, as the establishment at Washington of the Signal Service Bureau. It has been in operation only since November, 1870, and in this limited period it has become, through the efficiency of Brig.-Gen. A. J. Myer, the Chief Signal Officer, and his three able assistants, Profs. Cleveland Abbe, Thompson B. Maury, and the Acting Signal Officer, Lieut. R. Craig, one of the most complete organizations of the kind in the world.

At the commencement of 1871, the territory occupied by the stations of observation was mainly that of the United States, — to the east as far as Portland in Maine, thence along the Atlantic coast and the Mexican Gulf, very nearly to the Rio Grande, and along the southern shores of the great lakes, and throughout the interior, as the interests of the Service required. During the year reports were also received from stations located at wide intervals on the elevated plateau lying between the Missouri valley and the Pacific Slope, and from three points upon or near the Pacific coast.

During the past year the Service has been extended within the United States by the addition of several stations lying between those which were already established, and of several points of observation located in the valley of the Red River of the North, the peculiar meteorological conditions of which furnish an interesting source of study.

Beyond the United States, through the coöperation of

the Canadian Government, the Service has been extended northward, in the valley of the Red River, to Fort Garry, in Manitoba; thence along the northern shores of Lakes Huron, Erie, and Ontario, and down the valley of the St. Lawrence as far as Quebec.

Reports are also received from Halifax, Nova Scotia, and it is thought that arrangements will be made by which reports may be had from the islands of Cape Breton and Newfoundland. From the localities enumerated, telegraphic reports are received daily at the Chief Signal Office at Washington, and from them are deduced the daily forecasts of the weather. This branch of the Service has proved especially valuable, a comparison of the daily forecasts or probabilities with the meteoric condition, as afterwards ascertained, having given up to November 1st, 1871, an average of sixty-nine per cent, and from that date to October 1st, of last year, an average of verification of seventy-six per cent.

The summit of Mount Washington, N. H., has been occupied as a signal station for the past two years, and Gen. Myer expects to obtain reports from some of the loftier summits of the Alleghanies farther South during the present year. It is also probable that reports will be received from some peak of the Rocky Mountains during the ensuing summer.

As soon as it is practicable it is the intention of the department to establish a station of observation in the Sandwich Islands, from which, it is hoped, warning may be received of any meteoric disturbance originating perhaps on the coast of Asia, and destined to reach the Pacific coast of the United States.

It is also expected by the Chief Signal Officer that, during the present year, arrangements will be made for the receipt of telegraphic reports from various points in the West India Islands, which, it is hoped, may enable the department to announce the approach of many of these cyclonic storms, the presence of which is now only

known when they strike the southern coasts of the United States. As an additional aid in the tracing of these storms, regular observations are made upon several of the steamships plying between New York and the Isthmus of Panama, and it is thought that arrangements will be made whereby it will be possible to obtain a continuous record between this country and Europe by means of regular observations upon the transatlantic steamships.

Gen. Myer remarks in his report that sometimes observations made in Great Britain seem to indicate the presence there of disturbances traced out to sea from our shore; and, if the arrangements anticipated should be carried out, there will be from our remotest stations on the Aleutian Islands to Great Britain a connected line of observation, extending over nearly half the circumference of the earth. It is impossible to estimate too highly the importance of regular observations of this nature, in connection with those which have now been extended over a considerable portion of Europe. Humboldt, in treating of magnetic observations, has especially dwelt upon the greater value of those which have been regular and continuous over those that are taken at intervals, no matter how widely, over the earth's surface, and this remark applies with equal force to meteorological observations. "The Signal Service," says a writer in the *New York Herald*, "has given timely forewarning of the heavy storms upon our sea-coast and lakes, of the heavy rainfalls and floods, of the early arrival of frosts, and of the cold tidal air-waves which cover the land with snow;" and this kind of information has become so varied, extensive, and valuable, that it is in contemplation by Mr. E. R. Esterbrook, of the Signal Service of this city, to establish a monthly meteorological journal for the more regular and general diffusion of the facts, the deductions to be drawn from them, and the advancement of the

science of meteorology generally, which, I trust, will receive, as it deserves, a wide public support.

METEOROLOGY.

At the anniversary meeting of the Meteorological Society of London, last August, the president, Mr. Tripe, in his annual address, called attention to the valuable results obtained through meteorological observation upon the course of epidemics and the influence of high and low temperatures upon the public health. He said that the conclusion among meteorologists was tolerably uniform that very cold and very hot weather induce an increase in the number of diseases and deaths; that a cold, wet summer always coincides with a less amount of sickness and fewer deaths than a hot, dry summer; that very cold weather causes a great increase in the sickness and mortality of any given population; and that the increase extends to all kinds of diseases. That, for instance, small-pox increases as the temperature sinks below, and scarlet fever as it rises beyond, certain points; and that the influence of all other meteorological elements upon disease is almost inert as compared with temperature. He expresses the opinion that statisticians will eventually be enabled to determine the precise relations which exist between the state of the public health and meteorology; so that, in addition to the knowledge which these observations give us of the movements of the atmosphere and of the law of storms, we have also the expectation that they will shed additional light upon diseases and their causes.

AMERICAN GEOGRAPHICAL PAPERS.

In closing this record of our own labors during the year, I would call attention, finally, to the many valuable papers that have appeared in the course of the year in various periodicals, among which may be especially named the paper of Prof. J. Le Conte, of California,

entitled, "A Theory of the Great Features of the Earth," in *Silliman's Journal*,—a paper of great interest and value,—in which the professor does not assume to give an entirely satisfactory theory (for he concedes that the state of our knowledge does not yet admit of it), but claims to direct attention to what he insists is the true direction of inquiry. The paper of J. W. Foster, LL. D., in the *Naturalist*, on the mountains of Colorado, their topographical features, geology, vein-phenomena, climate, the effects of electrical phenomena in their vicinity, and the evidence of post-glacial action; and Mr. Muir's observations in the *Overland Monthly*, on the glaciers of the Sierra Nevada. Dr. J. P. Widney's paper, in the same periodical, on the Colorado desert, which he supposes, at a past period, to have been a portion of the Gulf of California, which then, he thinks, extended about 200 miles above its present limit. This upper portion, in his opinion, was cut off, upon the east side, by the Colorado River, depositing quicksand in its thick floods and a deposit of red mud from the great plateau of Northern Arizona, until the upper part, with an area of 180 miles in length and an average of thirty miles in width, was completely separated from the Gulf, and elevated into a barren desert, becoming, as he says, a disturbing element in the climate of Southern California. It is now, to use his own language, "a huge furnace, from which withering blasts make forrays upon the favored territories around;" and he calls attention to the importance and possibility of turning the river into it, and converting what is now a desert into an inland lake. And, lastly, Prof. T. B. Maury's paper, in the *Popular Science Monthly*, upon the Law of Storms, as developed by the collected observation of the U. S. Signal Service.

POPULATION OF THE UNITED STATES.

The Government published during the year the results of the census of 1870, by which it appears that the total population of the United States is 38,589,377.

The mixed population of the city of New York consists of: Native-born, 523,198; foreign-born, 419,094,—the excess of the native over the foreign being 104,104. The foreign population of the city of New York is thus distributed:

Irish	201,999
Germans	151,216
Austrians	2,737
English and Welsh	25,026
French	8,265
Scotch	7,562
Canadians	4,419
Poles	2,393
Swiss	2,178
Swedes and Norwegians	1,930
Dutch	1,237

The largest foreign population in proportion to the whole is in the city of New York. In this order Chicago stands next, then St. Louis; after St. Louis, Cincinnati, and then Philadelphia. In New York and Philadelphia the Irish outnumber the Germans. In Chicago, St. Louis, and Cincinnati, the Germans outnumber the Irish. In Cincinnati they are nearly three times as great; in St. Louis, nearly double; and in Chicago, about one-third more. In Philadelphia the Irish are nearly double the number of the Germans, and in New York they are about one-third more. The foreign population concentrates chiefly in the commercial cities, and in the manufacturing and mining districts of the eastern portion of the United States, and is largely distributed over the Western States. In the Western States the foreign emigrants are mainly found in the vicinity of lakes and rivers. They rarely settle in the mountain-districts, and prefer the wooded

country to the prairie. The Scandinavians seek the far States of the North-west, three-fourths of the Swedes and Norwegians being in Minnesota. The Irish are in the large cities, and in Massachusetts, in Connecticut, in North-western New York, in Northern Illinois, and in North-eastern Ohio. The Germans are largely represented in the cities, are widely extended over the Western States, and have avoided New England. The English and Welsh are found chiefly in or about the cities of New York, Boston, and Philadelphia, or wherever there are coal-fields or great iron-works. The Latin races, so-called, are relatively small. They do not, including Mexicans and South-Americans, equal the emigration from the kingdom of Bavaria alone. The Italians are but 17,149, and the Spaniards only 3,701, and of this small number one-third are in New Orleans.

Arctic Exploration.

In the beginning of the year great interest was manifested in the subject of Arctic exploration, for, apart from the geographical achievement of reaching the North Pole, it has now become apparent that Arctic exploration is of the highest importance in a scientific point of view, when it is accompanied with meteorological, barometrical, and astronomical observations, and an investigation of the Arctic fauna, flora, geology, and paleontology, in the latter of which departments of knowledge it has proved to be one of the most instructive of fields for the light which it sheds on the past physical history of the globe. It was hoped that this year would be especially propitious, as the summer of 1871 had been very favorable to exploration. The inhabitants of the most northerly settlement in Greenland told Dr. Bessells, of Capt. Hall's expedition, that there had not been so warm a summer for fifty years, and the effect of it was seen in an enormous drift of ice-fields southward from Smith's Sound and Baffin's Bay along the coast of Newfoundland from

February to May. "It may be affirmed, without exaggeration," says a writer from St. John's, Newfoundland, in May last, "that a river of ice, varying from 60 to 200 miles in breadth and 2,000 miles in length, has been for three months incessantly pouring its contents into the tepid waters of the Gulf Stream."

The experience of the two preceding years, 1869 and 1870, also gave great encouragement, especially in respect to that region of the Arctic between Spitzbergen and Nova Zembla. Capt. Palliser, a walrus-hunter, reached, in 1869, half a degree beyond Cape Nassau, and in his opinion, could then have sailed entirely around Nova Zembla. Capt. E. H. Johannsen, without any difficulty, traversed the entire Carian Sea twice, following its east and west coast without being disturbed by ice or seeing any considerable quantity of drift-ice in the entire sea. In 1870, the Norwegian fishermen reached the north-east coast of Nova Zembla, and remained on the coast until the latter end of October. During the same year Captain Johannsen sailed around the whole of Nova Zembla, which had never been accomplished before, and, in 1871, Captain Mack sailed along the west coast of Nova Zembla, 500 nautical miles, and reached Cape Nassau in the beginning of July, finding upon the islands violets, buttercups, and other flowers.

All this was very encouraging, so much so that the eminent geographer Petermann confidently expressed the conviction that a stanch steamer could pass from the Scandinavian coast through the Arctic Ocean to Behring Strait and return the same summer, to which should be added, that the result of the inquiries made at the Helder a century ago was, that the Dutch fishermen had always penetrated farther north in this part of the Arctic than in any other. Great expectations were consequently formed of what would be accomplished during the past year in this particular locality, which, I regret to say, have not been realized. A Russian expedition was talked

of, but nothing came of it. The long-projected French expedition for the exploration of the region between Nova Zembla and Behring Strait, which was to be commanded by Captain Mack, an officer experienced in Arctic exploration, it was anticipated, would sail; but, for some reason, the expedition was indefinitely postponed. Five expeditions, however, started,—Mr. Leigh Smith, in his yacht the "Samson;" two Norwegian expeditions, a Swedish expedition, and the Austro-Hungarian expedition. To this should be added explorations and discoveries by Capt. Nils Johnson, in Norwegian vessels upon the east coast of Spitzbergen.

Mr. Leigh Smith sailed in his yacht, toward the close of July last, with the intention to push his way to the east coast of Greenland, but was stopped by the ice. He then determined to attain the highest latitude possible, and afterward to attempt the examination of Spitzbergen. But it proved to be an unusually close season both on the western and the northern side. He reached only to 80° 30′ N. lat., less than he had attained the previous year. The yacht was beset by ice, sprung aleak, and Mr. Smith was compelled to return.

The Norwegian expedition consisted of two vessels, commanded by Capts. Jensen and Hansen. Its object was the circumnavigation of Spitzbergen. It was equally unsuccessful. One of the vessels damaged her screw, which disabled her; and the other, from inability to find an entrance through the masses of ice, was compelled to return to Bergen.

The Swedish expedition is one of great interest. It consisted of three vessels, — the steamer "Polhem," the steamer "Gladen," and the brig "Ouke Adam" — the expedition being under the general superintendence of Prof. Nordenskjöld, the eminent Swedish *savant* and Arctic explorer. This expedition was mainly equipped by funds subscribed in Gothenburg; and, from the accounts which I have read of its fitting out, it is, I

should think, for the combined purpose of scientific investigation and geographical discovery, the most thoroughly equipped expedition that has ever entered the Arctic seas. It started last summer, and the plan agreed upon was to pass the summer and autumn in explorations upon the east coast of Greenland, to winter in Mossell Bay, and next spring to reach the pole by sledge-travelling, for which every preparation had been made. Whether the expedition succeed in this or not, its further work will be to explore the Eastern Spitzbergen Sea, and to map the whole of the eastern lands, including the mysterious Gillies land; and a material part of the labors of these Swedish scientists will be to take meteorological, thermometrical, and magnetic observations, and do what they can for the science of zoölogy.

The steamer "Polhem" is the principal vessel. The other two were to have returned at the close of the summer; but as they failed to do so, great anxiety was felt in Sweden, for these two vessels had not been equipped to pass an Arctic winter. For this purpose a steamer—the "Albert"—was despatched with supplies, the hope being entertained, notwithstanding the lateness of the season, that she would be able to communicate with them. I am happy to say that news was received two months ago that the three vessels were in Mossell Bay, where they were to pass the winter—a point at which the succor brought out by the "Albert" may possibly reach them. Another expedition sailed from Sweden during the year to establish a colony on the southwest coast of Spitzbergen, the object being mercantile,—the obtaining of phosphates for artificial manure. If such a colony be established in Spitzbergen, it will be of great use in explorations, like the Danish settlement in Greenland, as a point to keep up communication and a depot for supplies.

The Austro-Hungarian expedition consisted of two vessels,—the steamer "Tegethof," the chief officers of

which are Lieutenants Weyprecht and Payer, and the yacht "Isbjorn," of Count Wilczek. It will be remembered that Weyprecht and Payer, in the preceding year, made an exploration of the sea between Spitzbergen and Nova Zembla, in the yacht "Isbjorn," which was preliminary to the present expedition. The object of the expedition, which was to be mainly carried out by the steamer "Tegethof," was to penetrate the sea east of Nova Zembla, and proceed, if possible, as far as Behring Strait, the main object being to explore the land lying to the north in that direction, which, it was supposed, would be facilitated by the warm currents of the Siberian rivers that terminate in this portion of the Arctic basin. If no land should be discovered at the North, then the "Tegethof" was to winter at Cape Tscheljuskin, the northernmost point of the continent of Asia. If it should prove impossible to reach Behring Strait or to return, then the yacht "Isbjorn" was to be abandoned, and Count Wilczek, his scientific associates and crew, were to return in boats by way of one of the Siberian rivers. The vessels reached Tromsö in June, whence the "Tegethof" proceeded and sailed along the western coast of Nova Zembla, encountering very thick ice; and Count Wilczek sailed to Spitzbergen, where, to the north and east, the sea was tolerably open. He attempted to ascend the Horn Sound, but, being unable to do so, sailed southward, where he encountered heavy masses of ice in the vicinity of Hope Island; upon which he sailed for Cape Nassau, Nova Zembla, and had great difficulty in forcing his way through the ice. On the 12th of August the two ships met, in about lat. 76° N., and after keeping company two days they parted, as the ice was everywhere forming; the "Tegethof" to proceed to the North and Count Wilczek sailing for the mouth of the Petchora River, which he succeeded in reaching after great difficulty. Here he and his party abandoned the yacht and ascended the Petchora with

their boats for six weeks, when they reached Perm, and from there they found their way to Moscow, about two months and a half ago.

Count Wilczek, in his communication to the Vienna Geographical Society, regrets that the season was so short, considering the rich material they found in Spitzbergen, in a geographical point of view, and says that both it and Nova Zembla yielded a rich harvest of botanical and zoölogical matter. Having with them good instruments, they made meteorological observations and coast and inland surveys. The "Tegethof" was heard from last on the 16th of August. The weather was exceptionally severe, but still Lieut. Weyprecht thought that they would be able to work round the northern part of Nova Zembla, and winter on the Siberian promontory, Cape Tscheljuskin, or as it is otherwise spelled, *Cheljuskin*. He says that they found the modern charts of the coast of Nova Zembla utterly untrustworthy, and that the old Russian charts were the best. He was, unfortunately, unable to make any corrections, as the continued prevalence of fogs and clouds prevented astronomical observations.

The unfavorable character of last summer for exploration, as shown in the result of these several expeditions, which may be attributed to the nature of the preceding winter, which was exceedingly cold, and the fact of the intense cold of the present winter, give rise, very naturally, to some anxiety respecting Capt. Hall and the "Polaris," which has not been heard from since August 5th, 1871. He was then off Tossak Tussuissuk, lat. 73° 21′ N., lon. 56° 5′. W. All on board were well. The sea-going qualities of the vessel had been tested and found favorable; his complement of sixty Esquimaux dogs had been obtained, and Hans Christian, the well-known dog driver, with his family, had joined the expedition. He met, at Hollensburg, Baron Von Otten returning from the Swedish expedition, who furnished

him with maps, copies of his log, deep-sea soundings, etc. I earnestly urged Capt. Hall, before he left, to abandon the attempt he proposed making by Jones's Sound and to go by Smith's Sound and Kennedy's Channel, following up the route of Kane and Hayes, which, I was convinced, was the route that offered the most advantages for an attempt to reach the pole, and he concluded to defer his decision until he should reach the Arctic. It appears from the communications received that Baron Von Otten advised him to go by Smith's Sound; and when last heard from he had concluded to do so, and on the 24th of August, 1871, with a full roster of thirty-eight persons, he sailed in his little vessel for Smith's Sound. The advantages of this route over all others, in an attempt to reach the pole, was earnestly advocated last April before the Royal Geographical Society of London by Capt. Sherard Osborn, R. N., upon the grounds that the nearest approach to the pole had been made in that direction, that it was attended with less risk than any other, and offered greater opportunities than the other routes for scientific observation; and this distinguished Arctic explorer and author was supported in these views upon that occasion by the eminent Arctic explorers Admiral Back and Sir Leopold McClintock. Admiral Back said that he approved of every word that Capt. Osborn had uttered; that the Arctic Committee had seriously considered the question, and had come to the conclusion that the route which offered the greatest probability of success was by Smith's Sound, or, as he expressed it, the route taken by the gallant American, Dr. Kane; and Sir Leopold McClintock said that he believed that that route afforded the best chance of reaching the North Pole, and also the safest retreat in the event of a reverse. It is the route which our own eminent explorer, Dr. Hayes, has persistently advocated for years, and is also the one recommended towards the close of the year by the various scientific societies that united in an

application to the British Government to fit out another polar expedition.

It is gratifying, therefore, to feel that Capt. Hall is at least in the right direction, and that the summer of 1871, when he sailed for Smith's Sound, was one of the most favorable seasons that have been known for many years. Still, the severe winter that followed, and the severity of the present winter, very naturally make us anxious, as his vessel was not specially built for service in these northern regions and is provisioned only for the year 1873; and it is very much to be regretted that the British Government, which has achieved so much in the field of Arctic exploration, did not respond to the call made upon it to send out an expedition this spring. Whilst upon the subject of the safety of Capt. Hall's expedition, I may mention that Mr. Howarth, in some recent views upon the temperature of northern climates, calls attention to the impression prevalent among whalers, that excessively severe winters in more temperate latitudes are generally accompanied by an unusual degree of mildness in polar regions.

In the year 1594 Barentz, the Dutch navigator, sailed around the north-east point of Nova Zembla, where, finding his further progress blocked by ice, and being unable to return, he and his crew built a hut in a little bay, where they passed the winter and underwent an amount of suffering that is almost without a parallel in the history of Arctic exploration. There is no record that any navigator since has passed the north-east point of Nova Zembla until the year 1871, when Capt. Karlsen, the master of a small Swedish sloop, of sixty tons, called "The Solid," succeeded in doing so and sailing into the little bay. He found the hut still standing, with everything remaining exactly as Barentz had left it 276 years ago. Its interior corresponded exactly with the old engraving of it attached to Gerard De Veer's narrative of the voyage, published in Amsterdam in 1598. The sleeping-berths,

the halberts, the muskets, the clock upon the wall, were in the same place. The hut had evidently never since been entered by man. Upon the outside were several large puncheons, and heaps of the bones of the bear, the reindeer, the seal, and the walrus. In the interior were the instruments and books used by the inmates, one of the books being a Dutch copy, in excellent preservation, of Mendoza's Description of China, the country they had hoped to reach by a supposed north-east passage around the pole. A flute was found that still gave out a few notes; a pitcher of Etruscan shape, exquisitely engraved, and drinking-vessels, recalling the touching incident, mentioned by De Veer, of these poor fellows, in the midst of their intense sufferings, asking their captain to let them make merry on Twelfth Night with a little sack and two pounds of meal,—an indulgence bringing to their minds the assemblage of friends, wives, and children, then in the enjoyment of that festive night in their far-off homes in Holland. The articles, about 150 in number, consisting, in addition to those named, of working-tools, cooking-vessels, pictures painted upon tin, an iron box, etc., were brought by Capt. Karlsen to Hammerfest, where these interesting relics were purchased for £600 by an English gentleman named Ray, then on his way to Lapland, who transferred them to the Dutch Government for the price he had paid for them, and during last year they were received in Holland, and are at the Foreign Office at The Hague until the final place of their deposit shall have been settled. All who have read the thrilling account of this early voyage, and of the fate of the intelligent, persevering, and brave commander, whose name has been given to the great bay that washes the western shores of Nova Zembla, will feel an interest in the recovery and preservation of these humble memorials of one of the most heroic of Arctic explorations.

GENERAL GEOGRAPHICAL LABORS.

In leaving the Arctic and our own country, I may enumerate, among the matters of general geographical interest, the Government surveys that are in progress and which are connected with the publication of maps in Great Britain, Sweden, Norway, Denmark, Belgium, Italy, and Austria. The Russian surveys in the Caucasus, in Eastern and Western Siberia, and in Turkestan, and the great survey in India, trigonometrical, topographical, and geological, which has been instituted by the British Government, the results of the two first years of which have recently been published in India. Observations upon changes that have taken place in the earth's level upon the northern shores of Africa, upon the coasts of Patagonia, and evidences observed of the past depression of a large part of South Africa. The proposed new measurements of arcs of the meridian, one to be measured by Gen. Bayer, from Christiania to Palermo, and a proposed prolongation of the French measurement of 1797 across the Mediterranean in the vicinity of Algiers. The fact observed by Mr. Hornstein, of Vienna, that terrestrial magnetism affords a measure of the period of the sun's rotation upon its axis, the observations of Mr. Hornstein leading him to believe that the three elements in terrestrial magnetism—the declination, inclination, and horizontal intensity—run in a cycle of 26.33 days, corresponding with the time of the sun's rotation upon its axis, which is also 26.33 days. Discussions carried on during the year respecting ocean-currents and the general laws of ocean-movements, chiefly between Dr. Carpenter and Mr. Croll; the former maintaining that the oceanic circulation and currents arise from causes produced by the difference of the temperature of the ocean at the equator and at the poles, and the latter disputing this hypothesis, and believing that the oceanic movement is due to other causes. Speculative discussions as to whether the interior of the earth is solid or

fluid. The exploration of the group of islands in the South Pacific known as the New Hebrides, in 1871 and 1872, by Lieutenant A. H. Markham, an interesting and valuable account of which was communicated by him during the year to the Royal Geographical Society. The expedition of the "Challenger," fitted out by the British Government at the instance of the Royal Society, for the examination of the great ocean basins of the world, in which will be embraced the contour and form of the ocean's bed, its currents and temperature at various depths; the animals, plants, and other objects found in it in different regions; the transparency of its waters in different parts of the world; the philosophy of the tides; and the geology, ethnology, biology, and botany of those parts of the earth above the waters which may be visited by the vessel. With all of this are to be connected determinations in respect to longitude, daily magnetic observations, hourly meteorological observations; and the relations of barometric pressure to latitudes are to be carefully elucidated. The Atlantic, Pacific, Antarctic and Arctic oceans are to be visited in the course of this voyage, which it is supposed will occupy three years and a half; an expedition, that, in the largeness of its conception and the completness of its equipment, is worthy of the scientific character of the nation that organized it.

An Italian expedition for a voyage around the world has also been instituted, consisting of two vessels, the "Garibaldi" and the "Corvelli." I am unable to state the nature of the investigations contemplated, but infer from what is said respecting it that attention will be especially paid to the hydrography and to an improvement of the cartography of the Pacific Ocean.

Archæological Discoveries.

Amongst the archæological results of the year may be named the discovery of additional lake-dwellings, or, as

they are called, lacustrine villages of the prehistoric inhabitants of Europe at Bienne, in Switzerland, and in other parts of Europe. The discovery of the skeleton of a man at Mentone, in France, which is supposed to be of great antiquity. The exploration, by Mr. J. Stevens, of pit-dwellings or tent-circles, at Finkly, near Andover, in England. The discovery, by Col. W. T. Roberts and a party of explorers, of the ruins of what was once a populous city, covering an area of about three square miles in an uninhabited and desolate part of Arizona, beyond the San Juan River, southward and westward, about ninety miles from the boundary lines between Arizona and Utah, and about the same distance westward from a prolongation of the western line of Colorado. The ruins were surrounded by a wall of sandstone about ten feet thick, neatly quarried and dressed, which had crumbled away in many places and was partially buried in the sand that had drifted around it. The entire area within the wall had formerly been covered with houses, built of solid sandstone, without mortar, and which exhibited excellent masonry in their construction. The ruins consisted entirely of stone, not a stick of worked timber having been seen. On the north-west coast of Asia near the Hellespont or Dardanelles, excavations were carried on in the years 1871 and 1872, by Dr. Henry Schliemann, north of the village of Burnarbaski, and to the east of the River Scamander, which have resulted in the discovery, in his opinion, of the site and the remains of ancient Troy, the full details of which were communicated by him to the *New York Herald*, and fill six columns of the issue of that journal of December 21st, 1872; a discovery, which, whether it has or has not revealed the site of Homer's famous city, is of great interest as disclosing the ruins of successive settlements, one above the other, upon the same site, in strata of comparative regularity; the upper part exhibiting the remains of wooden structures, below which were the ruins of the dwellings of a people who built with

unburned brick, and who from the religious symbols, the utensils, the implements and the pottery found, are supposed to have been an uncivilized people of the Arian race; and at the lowest depth of all were the ruins of structures built with massive stones, where a wall was found of huge stones joined together with clay, and the ruins of a colossal tower of solid masonry, forty feet thick, built upon the primitive rock which Dr. S. thinks may have been a tower on the wall and the one which Andromache ascended to sweep the plain in search of Hector. The pottery in the lower strata showed an advanced knowledge of art, and a taste and opulence very far beyond those of the people whose remains were entombed in the successive layers above. Lastly, I may mention Gen. Di Cesnola's discoveries in the tombs in the Island of Cyprus, a collection gathered from the exploration of more than 8,000 tombs during the last three years, and embracing more than 10,000 distinct and different articles. Glass of all forms, fabrics, and varieties, terra-cotta, statuary of various kinds, sizes, and periods, in bronze and in stone; vases, gems, and carved stones, jewelry, lamps, mirrors, weapons, utensils, implements, etc. Before this discovery few, if any, products of Phœnician art or manufacture were known, whilst here they are very numerous, combined with objects exhibiting the different stages of Egyptian, Assyrian, and Grecian art. As a collection representing the progressive development of ancient art, nothing like it has ever been obtained; and it is gratifying to know that the collection has been purchased by John T. Johnson, Esq., of this city, and is to form a part of the Metropolitan Museum of Art of New York.

ASIA.

A great deal has been done during the past year to enlarge our knowledge of Asia, and especially of that part of it from which the civilized world has been so long cut off through the jealousy of the local Mahometan

rulers. The advance of the Russians in Turkestan has been followed by geographical explorations and surveys on their part, with which have been connected barometrical and meteorological observations, and the advance during the year of a Turkish force into Arabia Felix, and the occupation by it of Sanaa, the ancient capital of Arabia, and the modern capital of Yemen, will lead to a more extended knowledge of this fertile portion of Arabia, of which we know comparatively little since the visit of Niebuhr in 1763. In 1870, Capt. Miles and M. Werner Munzinger, C. B., explored a portion of the interior of the southern part of Arabia, extending from Aden over three degrees of longitude, and Baron Von Maltzan has since been engaged in making researches upon the geography of the western part north of Aden, between the Strait of Bab-el-Mandeb and 48° E. lon., the results of which he has communicated in an interesting paper to the Royal Geographical Society. A corps of English engineers, under Major St. John, in exploring routes in Central Asia for a telegraph, have traversed portions of Persia, upon the eastern boundaries of it, hitherto almost unknown; and Mr. Blanford, in connection with this expedition, has been examining the geology of the coasts of Persia and of Beloochistan, on the Persian Gulf and the Arabian Sea. The Russian Government has had under consideration a plan for connecting the Caspian Sea with the Black Sea by a canal, which, though it will be but the length of a German mile, is a work of such gigantic magnitude that it will require the labor of 32,000 workmen for six years to complete it. It is doubtful, however, whether the advantages, commercial or otherwise, that would result from connecting the two seas are of sufficient importance to justify the enormous expenditure that would be requisite for the execution of the work. A railroad is also projected eastwardly from Scutari on the Bosphorus, and south of the Black and Caspian seas, to

Teheran, in the north-eastern part of Persia; thence to Herat, in Afghanistan, and from there south-easterly to Shikapore, in India. This project is one in the interest of the British Possessions in India, and if undertaken would doubtless be an English enterprise. A much more feasible and practical railroad route across Asia, it is supposed, would be one to be built in the interest of Russia, from Moscow through Nizhnee Novgorod to Tomsk, thence to Irkootsk, and from thence south around Lake Baikal, and across the Khalkas desert to Pekin, in China. Well-informed Russian gentlemen, with whom I have conversed, regard this route as a very important one in respect to the country through which it would pass. They consider it feasible, and anticipate no serious difficulty in carrying the road across the Mongolian desert in its approach to China. Mr. Prjevalski, a Russian traveller, has been engaged in the exploration of the south and south-eastern portions of Mongolia to the northern boundaries of the Chinese province of Hansu. He designs to explore the Aliakhan Mountains, and expects to make his way to Russian Turkestan, across the western portion of Thibet. Mr. Fedchenko made an important journey through Khokan as far as Gulcha on the east, and to the Alaï Plateau, and has collected a mass of information that will throw great light on the geography of that part of Asia. His journey in Southern Mongolia occupied ten months, and embraced a general survey of the country, meteorological observations, the collection of zoölogical and ornithological specimens, and a great variety of plants, insects, and specimens of minerals.

Mr. Staritzi, who has been engaged for five years in investigating the hydrography of the Sea of Japan, has returned during the year, and laid the results of his labors before the Russian Imperial Geographical Society. He has determined the longitude of thirty-eight different points within an area embraced between 15° N. lat., and 120° and 160° E. lon. His labors embrace observa-

tions on the coasts of Manchuria, the Island of Sega lien, the Okhotsk Sea, Kamtchatka, Japan, and the Chinese waters; an examination of the temperature of the Sea of Japan at different depths; the measurement of various heights in Kamtchatka, in which was included the volcano of Koriah, which he found to be 11,000 feet high, and a large number of meteorological observations. Capt. Fisler, a Russian officer of engineers, has explored the River Ili from the extreme eastern limit of the Khanate of Kuljah to the Balkash Lake, in Asiatic Russia, into which the river flows.

The results of the expedition under Maj. Sladen, instituted by the British Government in 1869, to explore the trade route between Burmah and China by the River Irrawaddy to Bhama, and thence to Momien, in China, have been published at Calcutta by Dr. Anderson, a member of the expedition. It is a work of great geographical interest, chiefly for the information it contains respecting the Irrawaddy and its sources, a river of the magnitude of the Ganges, which had remained hitherto unexplored. Capt. Burton, the well-known Asiatic and African traveller, has just published a work on the unexplored portion of Syria, and during the past summer he has been engaged in exploring certain parts of Iceland, of which we have little knowledge; collecting during his trip much geographical and anthropological information. A. Vambéry, the traveller in Bokhara, has given in Mr. Bates's *Illustrated Travels* an account of Dzungaria, or, as it is called on the maps, Soungaria, in the north-west corner of the Chinese empire,—a country recently conquered by the Russians, which extends to the north of Eastern Turkestan, and to the east of the Russian frontier, between 42° and 48° N. lat. And in the same work Mr. A. M. Cameron has begun the publication of a three years' journey in Borneo, the first part of which is especially interesting for a comprehensive account of the great Archipelago, of the islands of Sumatra, Luzon,

Celebes, Borneo, and Paqua, or New Guinea, written particularly with the view of calling attention to them as a new and vast field for exploration; where, he says, reputation can be achieved as great as that of Livingstone. Signori Beccaria and D'Albertes are now engaged in an exploring expedition in Papua, or New Guinea, under the auspices of the Italian Geographical Society. It appears that they have been advised to attempt the western side as the most accessible, but have determined to adhere to their orginal plan of beginning with the exploration of the River Outanata. The corvette "Vittoria Pisani" has since sailed from Japan to Papua, to communicate with these Italian explorers, and to supply them with additional funds sent by the Italian Geographical Society.

Africa.

The African results of the year have been the rescue of Dr. Livingstone and the knowledge of the explorations of Dr. Schweinfurth in the regions west of Khartoum and to within three and a half degrees of the equator. The account of the extensive explorations of M. Alfred Grandidier, the French naturalist, in the Island of Madagascar, and the explorations and discoveries of Karl Mauch in the regions north-west of the Trans-vaal Republic.

Dr. Livingstone.

The rescue of Dr. Livingstone, through the energy, intrepidity, and capacity of Mr. Stanley, in the successful carrying-out of the expedition instituted by our fellow-member, Mr. James Gordon Bennett, for the deliverance of the great African traveller, and the extensive nature of the discoveries he has made, have been so fully published in the journals of this country and of Europe as to dispense with the necessity of my doing anything more than to unite in the common congratulation interchanged throughout the world at this happy event. The limits of a

discourse embracing so wide a survey will not enable me to enter into any extended observations upon the Doctor's discoveries. I can only say that I share in the general impression that the great water-system he has been following up is not, as he supposes, connected with the Nile. This belief is founded upon Baker's measurement of the elevation of the Mwutan Nzigi, or Albert Nyanza, and Livingstone's account of the Lualaba River; the discoveries of Dr. Schweinfurth in the White Nile region; the fact that from Dr. Livingstone's account the Lualaba carries nineteen times as much water as the Bhar-al-Ghazel, the chief western tributary of the White Nile, and three times as much as the White Nile. These and other reasons advanced by Dr. Behm and Clements R. Markham, C. B., would seem to warrant the conclusion that the water-system which the Doctor has been exploring constitutes the chief source of the Congo, a river, at least as it approaches the Atlantic, of great volume, depth, and velocity. But this conclusion is disputed by Dr. Beke, a very competent authority on all African matters; and indeed it is a very hazardous thing to express any opinion upon the geography of the unexplored portions of Africa, as was found after the discovery of the curious course of the Niger. The southern part of the Mwutan Nzigi, or Albert Nyanza, has yet to be explored; and we must wait until Dr. Livingstone has completed his explorations, which will probably be accomplished in two or three years, for the solution of the problem. The last intelligence respecting the Doctor is that the supplies forwarded to him by Mr. Stanley had reached him, and that he had left Unyanyembe to complete his discoveries; also that his observations, which were brought to Zanzibar by Mr. Stanley, have arrived at the Cape, and are in the hands of Sir Thomas Maclear; that they contain some things that are new and interesting, are very voluminous, and that it will take two or three months to reduce them.

Dr. Schweinfurth's Explorations West of the White Nile.

Dr. Gustav Schweinfurth has been engaged, since 1868, in exploring Africa west of the White Nile, and has traced to its source the Bhar-al-Ghazel, the most important of the western branches of the White Nile. This gentleman, who appeared before the Berlin Geographical Society last May, has brought back a large amount of geographical information, which will go far towards settling, if it do not completely settle, the question of the sources of the Nile. He penetrated west as far as lon. 26° and south to within 3° 30′ of the equator; and, as Livingstone has penetrated to nearly an equal distance towards the equator, the space of this unknown region has been materially diminished, and will ere long be explored. Dr. Schweinfurth found that a spur from those Blue Mountains of the Balegga which were seen by Sir Samuel Baker formed the water-parting between the Nile and a river which the Doctor has discovered called the Uelle or Welle; and that the streams which have been explored either by himself, or, previously, by Petherick, rise on the northern side of this spur, or water-parting, and unite to form the Bhar-al-Ghazel. This water-parting, he says, has a uniform slope to the north and west, broken only by granite masses which rise to a height of 3,000 feet above the sea-level. This range seems to sink gradually to the west, and has, the Doctor says, a very different character from the Nile valley to the north, or the valley of the river at the south which he discovered, the Uelle. This river he found to be 800 feet wide and twenty feet deep; along its valley was a luxuriant growth of vegetation, oil palms, sugar-cane, and tropical fruits, and he thinks that this river continues westward and northward to Lake Tschad. In the Mombuttu country he found in the vegetation and in the animals indications of the affinity of that region with the western coast; amongst which may be instanced the existence of the gorilla.

Like Livingstone, he found tribes that are cannibals, and to the south of the Mombuttu country there exists a dwarfish race, or pigmies, known by the name of the Acca, which Herr Bastian, the president of the Berlin Geographical Society, supposes to be the Baccabacca, a dwarfish race, in the east of Central Africa, mentioned by early writers. Dr. S. brought one of these pigmies back with him nearly as far as Khartoum, who died and was buried at Khartoum. The discovery of this dwarfish people is a confirmation of the pigmies mentioned by Homer, Aristotle, and Herodotus as living near the sources of the Nile. The Dokos, or pigmies of Dr. Krapf, are placed by him about the same parallel of latitude, but further to the east; whilst the Obongos, the curious little people described by Du Chaillu, dwelt in Ashango Land, on the western coast, near the equator.

The people of Niam Niam or Sandeh, that inhabit the region where these western sources of the White Nile rise, and where the River Uelle flows, are described by Dr. Schweinfurth as totally different from the Nile tribes. He found them gluttonous, skilful in pottery without the use of the wheel, in basket-making, carving, carpenter-work, and in the forging of their weapons. They exhibited, also, great taste for music, having a national instrument, which is a kind of cross between the harp and the guitar. Their burial-rites resemble those of the Arabs, and their language is a Nubian dialect, without grammatical inflections or any words to express abstract ideas. This very interesting and important journey embraced a period of three years and four months, and Dr. Schweinfurth has now gone upon another African expedition, the expense of which is to be borne by his brother, a merchant of Riga.

M. Grandidier's Explorations in Madagascar.

M. Alfred Grandidier, a French naturalist, has been engaged for five years in exploring the Island of Mada-

gascar. He says that hardly any of the accounts that have been published respecting Madagascar, no matter in what language they have been written, are reliable; and that the interior of this great island upon modern maps is filled with false rivers, mountains, and places altogether imaginary. My limits will not allow me to go into the details of this most interesting exploration. Between the years 1865 and 1870 M. Grandidier fixed the latitude of 188 different points, the longitude of twenty-four towns; made a very large number of observations, barometrical, thermometrical, and astronomical, and examined the coast-line for 1,250 miles, and when to this are added ethnological investigations, the taking of a large number of photographs, and his collections in natural history, some idea may be formed of the extent and value of the labors of this indefatigable explorer.

ANCIENT RUINS DISCOVERED BY KARL MAUCH.

Karl Mauch, the discoverer of the gold-fields in South-east Africa in 1871, and who made the perilous descent of the Vaal River alone, in a wretched flat-bottomed boat, for 350 miles, to its junction with the Orange River, has made an interesting discovery of a ruined city lying 160 miles due west from Sofala, a town on the east coast of Africa. These ruins, which are named Zimbabye (in Portuguese Zimbaoe), and which he places in lat. 20° 14′, and lon. 31° 48′, consist of two different parts, separated from each other by a distance of 300 yards; the one part being upon a granite rock 400 feet high, and the other upon a terrace of lesser elevation. The heavy growth of vegetation and heaps of rubbish prevented him from examining them as fully as could have been wished. He found ruined walls, thirty feet high and varying from ten to fifteen feet in width, formed of stones of hewn granite, put together without mortar. In several places ornamental stone pillars projected eight or ten feet beyond the mason-work, and the

zigzag direction of the walls and labyrinthine passages connected with them seemed to indicate the ruins of a great fortress. He particularly examined a tower, thirty feet high, built also of blocks of granite, which was well preserved. It was cylindrical in form for the first ten feet from the base, the base being fifteen feet in diameter; and the rest of the tower was of a conical shape, being at the top eight feet in diameter. The presumption is that these ruins are of high antiquity. It is inferred, from their structure and general character, that they were not built by the Portuguese, the Arabs, or by any of the black tribes that inhabit the part of Africa in which the ruins where found. According to the account given by the inhabitants in the vicinity, they have occupied the country only for about forty years, and they say that when they came there the country was uninhabited. It was assumed, however, by all of them, that the region was once inhabited by a white race, which seems to be confirmed by traces of habitations, and by implements found, which never could have been made by the blacks. The country between the ruins and the east coast is of a most pestilential character, which will probably account for its remaining so long unknown. The country, however, where the ruins are situated is a fine one. It is a high plateau, 400 feet above the level of the sea, well watered, fertile, and thickly inhabited by a very industrious people, who are agriculturists and cattle-raisers. The existence of ruins of this nature so far inland from the coast is certainly very singular. It is conjectured that they were built by the Phœnicians; and Petermann, to whom Karl Mauch sent the account of his discovery, thinks, from their proximity to the newly discovered gold-fields, that the locality of these ruins is the Ophir so long sought for, to which Solomon sent for gold, ivory, and precious stones. The locality of the Ophir of the Bible, however, is a question that has been much discussed by archæological scholars and geographers, and there are many grave objections to be con-

sidered before entirely assenting to Dr. Petermann's conjecture. The intelligence has just been received that Karl Mauch has returned to Europe, I regret to learn, very much enfeebled by the African fever.

Suppression of the African Slave-Trade.

Whilst the slave-trade has entirely ceased on the west coast of Africa, it is maintained with great activity upon the east coast, and in the countries watered by the streams which flow from the west into the White Nile; the point of concentration or the emporium of the latter traffic being at Khartoum, on the White Nile. It has been for the suppression of the latter trade that, with the aid of the Viceroy of Egypt, the expedition of Sir Samuel Baker was undertaken, and that distinguished traveller was of the opinion, towards the end of 1870, that the traffic upon the White Nile had been entirely suppressed; but information from Khartoum, during the present year, is to the effect that this is far from being the case. Dr. Schweinfurth is of the opinion that the military expedition of Sir Samuel Baker into the countries of the Bhar-al-Ghazel, which, he says, has already cost £400,000, is, as he expresses it, "an awful mistake." He says that the best the Viceroy can do with these negro countries is to let them alone; that they are not productive, and that if they were, their distance from navigable streams is too great to admit of the exportation of anything less valuable than ivory. In his opinion, the slave-trade can be stopped in this direction only by cutting off its sources, and closing up its outlets; which he regards as a difficult and very expensive undertaking. Baker left Gondokoro in 1871, and nothing definite has since been heard from him. Fearing that he might be cut off by intervening hostile tribes, the Viceroy of Egypt has recently decided to send an expedition for his relief, the command of which is to be intrusted to Col. Purdy, an American officer. Sir Bartle Frere, at the head of an expedition for the suppression

of the slave-trade upon the east coast of Africa, has arrived at Zanzibar. From the capacity of this eminent man, supported as his expedition is by the governments that have coöperated to further its objects, there is reason to hope that he will be able to destroy the means that have hitherto sustained the slave trade upon the eastern coast, through the open support of it by the Sultan of Zanzibar, and the secret encouragement given to it by the Portuguese officials. The opening of the large region of Central Africa to civilization—a country the great value of which is now becoming apparent—depends more upon the suppression of this infamous and debasing traffic than upon anything else.

THE LIVINGSTONE EAST COAST EXPEDITION.

In connection with the expedition of Sir Bartle Frere is what is known as "The Livingstone East Coast Expedition," for the prosecution of which Sir Bartle Frere has received £1,500 from the Livingstone Fund. The command of this special expedition has been intrusted to Lieut. V. L. Cameron, R. N., who will be accompanied by Dr. Dillon. What is to be undertaken is to be settled at Zanzibar, and is, probably, now determined upon. Mr. Clements R. Markham, C. B., is of the opinion that the expedition will proceed to Lake Tanganyika, and from there attempt to communicate with Dr. Livingstone, who, it is thought, may be then upon the western shore examining the underground dwellings of Kabogo; that it will supply the Doctor with the watches and instruments he needs, and then undertake any work he may suggest. It is supposed that he will desire that these officers should examine the region of Lake Ukerewe, or Victoria Nyanza, and explore the country between the southern end of the Mwutan Nzigi, or Albert Nyanza, and Lake Tanganyika.

Livingstone's Congo Expedition.

There is also a coöperating expedition upon the west coast, called "The Livingstone Congo Expedition," commanded by Lieut. W. J. Gandy, R. N., an officer who has had experience as an African explorer, both upon the western and the eastern coast. This expedition is fitted out by the Royal Geographical Society, a fund of £2,000 having been generously contributed for that purpose by Mr. J. Young, Livingstone's old and tried friend. This expedition has gone to Sierra Leone, where the Africans who are to accompany it are to be obtained, and from thence it will proceed to St. Paul de Loando, south of the mouth of the Congo. From this place the expedition will make its way by San Salvador to the banks of the Congo, and, ascending this great river, will attempt to reach its head-waters and source, which is supposed to be one of the great lakes recently discovered by Livingstone. Lieut. Gandy, before his departure, published an admirable paper on the Congo, in Mr. Markham's *Ocean Highways*, embodying all that is known respecting this important river, accompanied by a map giving an outline of the country from the west coast to the region of Livingstone's discoveries; upon which Lieut. Gandy has indicated his conjectures as to the upper tributaries and sources of this long-known and mysterious river. The Congo, under the name of the Zaire, has been represented upon maps since the days of Ortelius as one amongst the greatest of African rivers, as an immense stream running westwardly into the Atlantic, and deriving its waters from a great chain of lakes; and yet, with the exception of the exploration of it for 280 miles by Capt. Tuckey, in 1816, we know as little about it now as was known in the sixteenth century. This is, therefore, a most important expedition; and, if successful, there is every reason to believe that it will, in connection with the recent discoveries of Livingstone, clear up what is now the greatest of African problems.

CONCLUSION.

In conclusion, I may say, after this survey of the labors of the year, that the spectacle it presents is one of earnest and wide-spread activity in the prosecution of geographical inquiry. This is due in no inconsiderable degree to the formation in different countries, within the last forty years, of geographical societies that have gradually impressed upon the age the importance of exploring the unknown regions of the earth, and of obtaining more accurate and scientific knowledge of the parts that are known,—as a means alike of bringing about a more extended intercourse amongst mankind, and of enlarging our knowledge of those great physical laws, as yet but imperfectly understood, which affect the earth and everything existing upon it.* This activity is due

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* There are now throughout the world, as far as I have been able to ascertain, thirty-one (31) geographical societies. I give their names and where situated. BELGIUM: Belgian Geographical Society, *Antwerp.* ENGLAND: Royal Geographical Society, *London.* FRANCE: Geographical Society, *Paris;* the Geographical Circle, *Lyons.* RUSSIA: Imperial Russian Geographical Society, *St. Petersburg;* Geographical Society, *Irkootsk;* Society of Explorers of Western Siberia, *Omsk;* section of the Imperial Russian Geographical Society, *Orenburg;* Caucasian Geographical Society, *Tiflis;* section of the St. Petersburg Society, *Vilna.* GERMANY: Geographical Society, *Berlin;* Imperial Royal Geographical Society, *Vienna;* Geographical Association, *Dresden;* Geographical Society, *Munich;* Association of the Friends of Geography, *Leipsic;* Committee of the North-Polar Expedition, *Bremen;* Association for Geography and Kindred Sciences, *Darmstadt;* Association for Geography and Natural Sciences, *Kiel;* Geographical Institute, *Gotha.* HUNGARY: Association for the Exploration of Transylvania, *Hermannstadt;* Geographical Society, *Pesth.* HOLLAND: Royal Institute for the Philology, Geography, and Ethnography of Dutch India, *The Hague.* ITALY: Italian Geographical Society, *Florence;* Italian Geographical Circle, *Turin.* SPAIN: Royal Spanish Academy of Archæology and Geography, *Madrid.* INDIA: Geographical Society, *Bombay.* UNITED STATES: American Geographical Society, *New York.* MEXICO: Mexican Geographical and Statistical Society, *Mexico.* SOUTH AMERICA: Imperial Geographical Society, *Rio Janeiro;* Historical Geographical and Ethnographical Institute of the Empire of Brazil, *Rio Janeiro;* Historical and Geographical Institute of the Rio de la Plata, *Buenos Ayres.*

also to the establishment during the last few years of periodicals devoted either exclusively or in part to the advancement of geographical science. I would especially refer to Dr. Petermann's *Mittheilungen*, and Mr. Markham's *Ocean Highways*, periodicals distinguished for the marked ability with which they are conducted, and the extent and value of the information they supply. I should also mention the monthly *Illustrated Travels*, edited by H. W. Bates, Esq., the Assistant Secretary of the Royal Geographical Society; the weekly publication of *Nature*, conducted by Mr. J. Norman Lockyer, the eminent astronomer, which as a general scientific journal furnishes much information upon geographical subjects; the *Annuaire Géographique*, published at Paris; and *Le Globe*, a geographical journal, published at Geneva.

The stimulus given by the geographical societies, and by these periodicals, is very essential; for no branch of knowledge has been so slow in its development, or has had so many obstacles to overcome, as geography. The world has had to unlearn a great deal believed in for centuries upon the tales of travellers, and the imaginary knowledge of cosmographers. It took a long period of time to convince men of what was opposed to the evidence of their senses,—that the earth, instead of being flat, was round; that, instead of being stationary, it was constantly in motion; and that, instead of the sun's moving around it, it moves around the sun. The spherical form of the earth, its diurnal motion upon its axis, and its annual revolution around the sun, were known to Eudoxus 300 B. C.; and 450 years afterwards, in the second century of our era, Ptolemy, in his principal work, brought together a body of reasons, many of which are incomprehensible to us, upon which he came to the conclusion that the alleged diurnal and annual movement of the earth were untrue, and the world accepted his decision for 1,300 years. Within twenty years after Galileo

demonstrated the diurnal motion of the earth, Bernard Varen, or, as he is called, Varenius, the physician of Amsterdam, published the celebrated work which revolutionized the science of geography, and laid the foundation of a separate science, that of physical geography; and yet it is only within the last half century that physical geography has assumed the character of a distinct branch of inquiry. Even at the present period the progress of geography is slow, for if we use the term "knowledge" as expressing what the science of geography demands, the world is not more than half known; and though there are not now, as in the days of Prince Henry the Navigator and of Columbus, great continents or vast islands to discover, let it not be forgotten that a considerable portion of the earth is yet unexplored; that a very large part is known but imperfectly, and that physical geography presents an immense field for the future labors of mankind.

II.

ANNUAL ADDRESS.

By Daniel C. Gilman,

Late Professor of Physical Geography in the Sheffield Scientific School of Yale College, now President of the University of California, at Oakland.

Subject—GEOGRAPHICAL WORK IN THE UNITED STATES DURING 1871.

Delivered January 30th, 1872.

Mr. President and Gentlemen,—At the last annual meeting of the American Geographical Society, your attention was invited to a review of the last decade of geographical researches within the territory of the United States. This evening, in compliance with your invitation, I bring before you an account of the geographical work of our countrymen during the past twelve months. At first it seems to be a familiar and an easy task, but before I have concluded you will surely be impressed with the variety, the magnitude, and the success of the various enterprises which have been in progress under the auspices of American explorers, geographers, and men of science; I trust you will also appreciate the difficulty which there is in collecting and discussing the results of such investigations. It is only by occasional reviews like this that we can appreciate the great importance of maintaining, with vigor and liberality, in the national metropolis, an association, with its officers, its rooms, its collections, its bureau of charts, its library, and, above all, its publications, as the centre to which all important

researches and explorations may be reported, and to which the inquirer in any special field may turn with the certainty of ascertaining the latest and fullest information which is accessible on the subject of his investigations.

I do not know that we can claim any extraordinary activity for our countrymen during the year 1871, for they are always on the alert to extend their knowledge of the earth, and to gather in from the four quarters of the globe information which may be of advantage in its bearings upon scientific truth, or in its relations to the progress of commerce, civilization, and Christianity; and yet I am quite sure that no recent year has surpassed the one just closed in the amount and value of American geographical inquiry.

I. A General Survey of the Field.

Let us, in the first place, take a general survey of the labors of our countrymen in this department of research, passing with a rapid glance over all the field, and then let us pause to dwell, as carefully as the brief limits of a lecture will permit, upon the points of most significance and interest.

1. The departments of the National Government have been prosecuting their work of accurate investigations into the structure of our own country with their accustomed diligence, fidelity, and freedom from display. Especially to be held in honor are the officers of the Corps of Engineers of the United States Army, and those of the United States Coast Survey,—two departments of the public service which, in these days of criticism and reproach, may claim our closest scrutiny, and receive our highest commendations. The hydrographic works of these two corps,—the one surveying the sea-coast, and the other the lake shores and rivers,—have frequently received abroad and at home the rich encomiums which they deserve; but both these corps are now helping on some collateral researches,—the one by the Hassler Expe-

dition around Cape Horn, the other by the work of the surveyors and naturalists of the fortieth parallel.

The Mining Bureau, the Land Office, the Hydrographic Office, the Observatory, the Post Office Department, and the Smithsonian Institution have all maintained their investigations during the year just closed; but the twelve months are more remarkable for the completion of our decennial census, and the commencement of the publication of those statistical tables which are essential to the study of political progress.

The year is also noteworthy for the perfection of the U. S. Signal Service, which receives by telegraph daily reports concerning the weather, so complete and systematic, that they already throw great light upon the climate, and the laws of storms, and are destined to have more and more influence upon the promotion of human comfort and the protection of life and property.

2. The National Government has also lent its aid to the Polar Expedition of Capt. Hall; it has caused a rapid reconnoissance to be made of the Island of San Domingo, and it has instituted an inquiry into the fisheries of the coast, under the direction of Prof. Spencer F. Baird, of the Smithsonian Institution.

3. When we turn from the National Government to the separate States of the Union, we find that several of them are still prosecuting their geological surveys,—which are the common form in these days for the manifestation of local interest in natural science. Sometimes these surveys are purely geological, but usually they are extended to all the natural characteristics,—topography, climate, botany, and zoölogy. New Hampshire, New Jersey, Ohio, Indiana, Illinois, Michigan, Iowa, Louisiana, and California have been carrying forward these surveys, and reports have been published in each of these States.

4. By the enterprise of private men of science, and by the aid of great corporations much important knowledge has been accumulated. Chief of all such researches is

the work of the Northern Pacific Railroad Company, which, while actually constructing the railroad line, at both the eastern and the western extremity, is also carrying forward important surveys upon the lofty regions of the North-west. Similar work, of which I have less definite knowledge, is in progress in the South-west.

5. Our various journals abound in minor essays illustrative of American geography, among which should be especially noted the studies of Prof. James D. Dana in respect to the glaciers of New England; the elaborate inquiry of Prof. Hilgard in respect to the formation of the Gulf of Mexico and the Mississippi Delta; the essays upon Earthquakes and Volcanoes, published in the *North American Review*, by Prof. J. D. Whitney; Clarence King's lively sketches of mountaineering in the Sierra Nevada, which appeared in the *Atlantic;* the contributions of Rev. James Condon, and others, to the *Overland Monthly;* the Border Sketches of Gen. Marcy, which belong to the lively pictures of frontier-life; the various studies of the earthquakes of 1870, and the historical survey, by W. T. Brigham, of the earthquakes known to have occurred in New England from 1638 to 1869.

6. Our countrymen have also been more or less at work in foreign lands. A new survey of the Isthmus of Darien has been made by Capt. Selfridge. The head of an important department of the Government, Mr. Capron, has been called by the Government of Japan to investigate the resources and capacity of that empire; Dr. B. A. Gould has successfully established the observatory at Cordova; Prof. W. D. Alexander has begun a survey of the Sandwich Islands, upon the method of the United States Coast Survey; Mr. Squier has been publishing his observations in Peru; Prof. Hartt has returned from a new visit to the Valley of the Amazon; Mr. Gabb has been led, by the action of our government, to print a summary of the observations he has for several years been prosecuting in San Domingo; Dr. Habel has returned

from a seven years' residence in Central and South America, to work up, on the banks of the Hudson, his observations; a party of students from Williams College have been at work under the charge of H. M. Myers, in researches in Spanish Honduras, and a committee of American gentlemen, all of whom have travelled in the Holy Land, has been organized to coöperate with the Palestine Exploration Committee of England in the survey of Biblical lands. This review would not be complete without an allusion to the party of American astronomers who visited the South of Europe, to observe the solar eclipse of December 22d, 1870, and who have been publishing their researches.

Such are the topics which suggest themselves in a rapid survey of the progress of geography, by the labors of Americans, during the year 1871. It is obvious that we can dwell upon only a very few of the undertakings of which I have given you a list. The selection I make is based upon the general interest which may be felt upon the subject; for often the most patient and elaborate work is ill fitted to be brought forward for discussion in a popular address.

II. The Work of the Corps of Engineers, U. S. A.

Under the engineers of the army, of whom Maj.-Gen. A. A. Humphreys is chief, a vast amount of skilful labor is performed, pertaining to the improvement of our harbors and rivers, as well as to the construction and repair of fortifications on the sea-coast and upon the frontier. But, besides these services, several works have been lately in progress, which are of national interest and of geographical significance, directed by this accomplished corps. I refer especially to the survey of the great interior lakes, which has been for many years in successful progress, the survey of the fortieth parallel, the survey of Arizona and Eastern Nevada, and the noteworthy reconnoissance of the Yukon River, in Alaska. For all these matters

of general interest, besides a vast amount of important details in respect to the astronomical, geodetic, meteorological and engineering work of the corps, reference should be made to the report of Maj.-Gen. Humphreys, one of the most comprehensive and satisfactory of all the reports which are annually prepared for Congress.

1. The prosecution of the survey of the great lakes is entrusted to Gen. C. B. Comstock, of the Corps of Engineers, under whose direction in the past year the work was carried forward on Lake Superior, Lake Michigan, Lake St. Clair, Lake Champlain, and on the St. Lawrence River. Among the interesting points in his report may be mentioned the determination by telegraph of the longitude of Detroit, Duluth, and St. Paul; the careful measurement of a base-line, not far from three miles in length, on Minnesota Point, near Duluth; the introduction of plane-table work on the shore of Lake Michigan; the institution of an inquiry into the tides and *seiches* of the lakes (the latter of which, it is suggested, may be due to tornadoes); the prosecution of deep-sea soundings in Lake Superior, with an investigation of the organic life at low depths, by Prof. S. I. Smith; and the diligent elaboration of the ordinary details of the survey by triangulation, topography, hydrography, and the publication of maps. A commencement has been made of a survey of the River St. Lawrence, from the northern boundary of New York to the east end of Lake Ontario; and the southern end of Lake Champlain for thirteen miles has been surveyed.

2. The survey of the fortieth parallel, which is also under the guidance of the Chief Engineer of the Army, has been vigorously prosecuted during the past year, not only by observations in the field, but also by the publication of two of the elaborate reports. Mr. Clarence King, the well-known leader of the expedition, with the title of United States Geologist, has published, in the *American Journal of Science*, an account of the glaciers of the

Pacific coast within the territory of the United States, and he has contributed to the *Atlantic Monthly* a series of vivacious articles illustrative of his experience in "high mountaineering." As the scientific results of this expedition begin to appear, and attract attention at home and abroad, it may be well to recapitulate the outlines of this great survey.

The survey was organized under Mr. King's direction, in the spring of 1867, for the purpose of making a geological and topographical examination of the country bordering upon the Union and Central Pacific railroads, as far to the north and south of the fortieth parallel as practicable. In the first season the survey was carried from the western boundary of California as far east as the second Humboldt range. A detailed examination was also made of the Washoe silver region. The next summer (1868) the survey was carried on in three divisions as far as the western limit of the Great Salt Lake Desert. The Toyabe silver-bearing mountain-range, the White Pine silver district, and some of the metalliferous deposits of Colorado, were also examined. In 1869 the survey was carried eastward as far as the Green River divide, the belt measuring, as before, 100 miles from North to South. A short campaign, in the autumn of 1870, was devoted to a study of the sources of the lava-flows which have poured eastward from the axial line of the Sierra Nevada and the Cascade ranges into the Great Basin. During the summer of 1871 the field work was still in progress, one party having entered the Uintah Mountains from Fort Bridger, working eastward toward the Green River cañon, and the other going from Fort Sanders into the North Park and the Elk Head Mountains. Both parties found the wide-spread smoke a great obstacle to topographical work. The character of the work performed has been, first, topographical, a system of triangulations having been carried from summit to summit over the whole country traversed.

Minor triangles have been measured, the elevations approximately determined upon a system of 300 foot grade-curves located by the barometer, and the altitude of all prominent mountain-peaks and localities upon the plains has also been determined. Careful and actual geological sections have been made over the whole area; the climatic conditions of the Great Basin have been studied; the botany and geology of the region traversed received special attention, and the mining industry has been elaborately investigated.

The two portions of the work which have been published within the year lie before you; one is the report on the mining industry, a volume of text with an atlas; the second is the report of the botany, the illustrations of which are inserted with the text.

It would lead me beyond the limit of this discourse were I to give a particular account of the two reports; but they are too interesting to the geographer to be passed by with mere mention.

The first chapter of the volume on mining districts relates to their geographical distribution and geological mode of occurrence. After a brief description of the Great Basin, and a reference to the one prominent law of arrangement of the Cordilleras, that they wend from north or north-west to south and south-east, Mr. King affirms that all the structural features of local geology are in strict subordination to this longitudinal direction of ranges. So, likewise, the localities of the precious metals, as originally noticed by Prof. W. P. Blake, appear to arrange themselves in parallel longitudinal zones. After this introduction there are geological descriptions of the most famous of the mining districts of Nevada, an investigation of the Green River coal-basin, and an inquiry into the mines of Colorado, by Mr. J. D. Hague, especially the gold district of Gilpin county and the silver district of Clear Creek county.

A novelty in subterranean geography or cartography

is presented in the atlas which accompanies this volume, in which many miles of hidden roads and passages are carefully delineated.

The Botany has been prepared by Mr. Sereno Watson, the chief collector, with the coöperation of Prof. D. C. Eaton, in whose herbarium and library the description of the plants was perfected. Somewhat more than 100 species new to science are described, and much light is thrown upon the distribution of timber and on the families of the desert-flora. The work is prefaced by a clear and compact account of the region traversed, with an excellent outline map, and with a very striking general description of the vegetation of the country,—the mountainous and desert region of Northern Nevada and Utah,—the northern portion of what used to be called "The Great Basin." The vegetation, like the country, should be considered in its two chief aspects,—that of the mountain, and that of the valley. No portion of this whole district, however desert in repute and in fact, is destitute of some amount of vegetation, even in the driest seasons, except only the limited alkali flats. But the vegetation is monotonous in aspect by want of trees and grassy greensward, by the wide distribution of a few low shrubs, and by the universally prevalent gray or dull olive color of the herbage. "The everlasting sage-brush" (*Artemisia tridentata*), familiar to all travellers, is everywhere present. To the general absence of trees the Truckee Valley presents an exception, where two varieties of poplar grow freely in the river-bottom. So on the mountains, which are usually treeless as the valleys, a few scattered varieties of trees are found, mostly within the cañons, and probably never exceeding forty or fifty feet in height. The mountain-flora includes a larger number of shrubby species than that of the valleys, though many of them are very sparingly distributed. The number of Alpine and sub-Alpine plants are proportionally large. The total number of indigenous, phænogamous species enumerated

in the report is 1,235, representing 439 genera, and eighty-four orders,—about one-third of which belong to the mountain flora, one-fourth to the desert flora, and the remainder to the "alkaline" and "aquatic" groups. The essay, from which these particulars are gathered, is a very interesting exhibition of the geographical distribution of the plants of the region.

The agricultural resources of the basin are quite restricted. Even were the rivers and streams most economically distributed, it is estimated that of 34,000 square miles examined in Northern Nevada, not over 1,000 square miles could ever be brought under cultivation. Some investigations were made as to the possibility of cultivating certain forms of vegetation without irrigation, but on a scale too limited to be conclusive.

3. Besides the exploration of the fortieth parallel, there is another important survey in progress, under the direction of Lieut. Geo. M. Wheeler, of the corps of engineers, covering a district considerably to the south of the Central Pacific Railroad, and including sections of South-western Nevada, South and Eastern California, South-western Utah, Northern, North-eastern, and Eastern Arizona. The party, who numbered some eighty-five persons, took the field in May, 1871, and continued at work till December, when they returned to winter quarters. Their purpose has been to attain a thorough topographical knowledge of the country, to determine the latitude and longitude of important points, to observe the geology and vegetation, to inquire into the numbers and condition of the Indians, and the facilities for road-construction, etc. Those who are familiar with these regions will observe that this work is a continuation of that which was carried forward in 1869 by the same officer of the engineers.

From unofficial statements we learn that the success of this great undertaking has been all that could be desired. The months of September and October were devoted to

the Colorado cañon, which was penetrated to a distance of 225 miles above Camp Mohave. The topographical data, the zoölogical specimens, the photographs and drawings, the facts illustrative of the ancient civilization, and the mining information, are said to be full and important.

But one grievous occurrence has saddened this brilliant record. The chief topographer of the party, Mr. P. W. Humel, and that accomplished young writer, Mr. Loring, of Boston, were cruelly murdered by the Apache Indians, on the Wickenburg stage, as they were homeward-bound with the results of their observations, after having encountered, without molestation from the Indians, all the perils and hardships of the exploring party. The notes of the chief topographer have been recovered in a condition for use; those of the volunteer observer, from which an entertaining book might have been expected, can hardly be made use of.

4. Within the last twelve months we have also had from the engineer corps an important contribution to our knowledge of Alaska. The reconnoissance of Capt. C. W. Raymond upon the Yukon River, which was commenced in the spring of 1869, was completed in the summer; and the report, with a map, which hangs before you, was submitted to Congress in April last.

The chief point to which Capt. Raymond's attention was directed was the determination of the latitude and longitude of Fort Yukon. Incidentally, the trade of the region was to be examined, and the condition of the native tribes investigated. He was also directed to ascertain as much as possible in respect to the resources of the Yukon and its tributaries.

The delicate and responsible duty intrusted to Capt. Raymond (which was performed in a highly creditable manner, according to the published endorsement of the chief of his corps Gen. Humphreys), will quickly be comprehended from a single statement. Fort Yukon, the

most northern point of the river of that name, for several years past has been the extreme western trading-station of the Hudson Bay Company. It was supposed to be west of the boundary between Russian and British America; and, if so, its establishment was contrary to the terms of a treaty between Great Britain and Russia. The Russians, however, had been quite indifferent in the matter; but not so the Americans, who, after the acquisition of Alaska, began to push up the Yukon River for purposes of trade. This made it very important to determine the exact locality of the fort, and Capt. Raymond volunteered to undertake the difficult and hazardous duty. Launching a little steamer near the mouth of the river, he set out, on the 4th of July, 1869, to make the ascent; reached Fort Yukon, a distance of over 1,000 miles, traversed wholly by the steamer, on the 31st of the month; determined the latitude to be 66° 33′ 47″, and the longitude 145° 17′ 47″; set at rest the question at issue; informed the traders that they were in American territory; and, on the 9th of August, took possession of the buildings, and raised the flag of the United States over the fort.

The map which hangs before you embodies, in a cartographical form, the result of this reconnoissance. The maps of a previous date have been based on that of the Russian lieutenant, Zagoskin, which was made in 1842–3, with the corrections and additions of Dall, Whimper, Smith, and other explorers of the telegraph company. The journey of Messrs. Ketchum and Labarge, of the telegraph company, in 1866, first established the fact that the Kvichpak River of the Russians, and the Yukon of the English, were the same streams. These travellers, to whom Capt. Raymond expresses his thanks, have not published their narrative.

The report of Capt. Raymond, extending through 110 octavo pages, is very clear and comprehensive, and throws much light upon our new acquisitions. This reconnoissance, with the work of Mr. Davison, of the Coast Survey,

on the coast, and the volumes of Messrs. Dall and Whymper, are the geographical fruit of the Alaska purchase.

III. The Survey of California.

Since the publication of the Natural History of New York, and the Geology of Pennsylvania, there has been no survey of one of the United States at all comparable in fulness and in importance with the survey of California, now in progress, under the direction of Prof. Josiah D. Whitney. Everybody talks about the wonderful natural resources of the Golden State; but few people, even within its borders, have any adequate conception of the admirable inquiries into, or presentation, of these resources which have been made by the State Geologist and his associates. We presume that the word "geology," while it has had a charm for some persons, has to others conveyed too restricted a meaning. The people of the State cannot have appreciated that under this designation they were securing elaborate and accurate maps of the entire State, and (on an enlarged scale) of certain important localities; a comprehensive study of the physical structure of the country, as a basis for investigations into the climate, agriculture, facilities of communication, and sanitary conditions of a new and undeveloped region; an original investigation of the geology, both in its general and its economic aspects, and a full study of the animals and plants which are native to the region. The size of the State, its wonderful capabilities, its variety of attractions, its marvellous growth, its prospective wealth and influence, are circumstances which render it very desirable that the original survey of the State should be on a good plan, by good methods, and by competent observers. All these conditions have been secured. Only one other element was necessary,—liberal financial support. In this the State has wavered, but now gives signs of a determination to see the work completed as it should be.

However costly the outlay, we are sure it will never be regretted. The strictest principles of economy require that such a work should be vigorously prosecuted and thoroughly performed.

The results of the survey, thus far, are as follows: (*a*) The publication of a map of the Bay of San Francisco, and its vicinity, on a scale of two miles to an inch, of which a copy was shown to the Society last year. Two other maps are also in the engraver's hands. (*b*) The first is on a scale of six miles to an inch, embracing about 60,000 square miles in the central and most thickly settled part of the State. Of the four sheets which this map will cover, the two southern are almost ready for publication, and the two northern will be ready in about two years. (*c*) A general map of the State, on a scale of eighteen miles to an inch, to be issued both as a topographical and as a geological map, will also be ready before spring. Only one corner of the central map remains to be surveyed topographically. (*d*) Four volumes of illustrated text have also been printed, besides the Yosemite Guide, and various brochures. One of the volumes is a preliminary report on the structure of the State, two are devoted to paleontology, and one to ornithology. The last has been published within the year, and is devoted to the birds, not only of California, but of the North-American continent north of Mexico, and west of the Rocky Mountains. The second volume of the birds is nearly ready. Prof. Baird and Dr. Brewer are its editors. Prof. Baird and Dr. Cooper have prepared the first. During the last year Prof. W. H. Brewer has been engaged in the herbarium of Dr. Gray, in Cambridge, upon the description of the plants of the Pacific slope, collected by him as the botanist of the survey. A volume of conchology is also nearly ready. The geology proper is also to be pushed forward with vigor. Men of science everywhere hail with satisfaction the progress of this publication as honorable,

not only to California, but to American science, and which is published with a degree of typographical and cartographical accuracy and beauty which is worthy of the geological work. Those who would learn more of the nature of the survey may turn with advantage to a fresh and trustworthy article in the *Overland Monthly* for January, 1872.

IV. The Northern Pacific Railroad.

The attention of the public is often directed to the financial attractions of the Northern Pacific Railroad, and to the immense advantages which will accrue to the country from the completion of a second railroad line to the Pacific, shorter, lower, and easier than the central route. The central route has already modified the commerce of the world by making this country a common highway from Western Europe to Eastern Asia; and every additional facility for transcontinental communication which is secured increases our national commerce and power. It is not long since I heard one of the high officers of the government, officially informed upon the matter, declare that the solution of our Indian troubles in the North-west depended upon the rapid prosecution and completion of the second Pacific Railroad; for, however jealous the North-western tribes may be of the approach of a party of engineers, they cannot resist the influences of power and civilization which the locomotive brings with it.

But, while some of these general aspects of the Pacific railroads are familiar to us, we are in danger of failing to notice how great a contribution is quietly making to our knowledge of Western geography by the parties of engineers who are persistently carrying the level, the transit, and the barometer into obscure and almost inaccessible parts of the national territory. These surveys have been extended from the Pacific to the Mississippi, on the line of the Northern Pacific Railroad, there being

at the present time, as I am informed, but a short space of seventy miles which remains undetermined by the level.

Gen. W. Milnor Roberts, the chief engineer of this road, has recently returned to New York, and with reference to this lecture has been so kind as to give me much information in respect to the surveys of which he has been both superintendent and participant. He mentioned incidentally the great service which the telegraph had rendered in the conduct of parties in the field, so widely separated. By its aid he has been able personally to direct the work which has been in simultaneous progress upon both the eastern and the western slope of the Cordilleras, sending his orders and receiving information freely by the telegraph.

The work of his parties last summer is of the greatest interest, from the fact that a large part of it was concentrated upon the question as to the most favorable route for crossing the Rocky Mountains in Western Montana, with the subordinate consideration of the Yellowstone Valley on the east as a mode of approach to the summit, and on the west of the relation of the railroad route to the lofty Bitter Root Mountains, which have hitherto been quite inadequately explored.

Those who are familiar with the history of Rocky Mountain explorations are well aware that the earliest crossing of the Divide took place in the region which was so carefully examined last summer. Here it was that, in 1805, Lewis and Clark, those intrepid pioneers, attained the highest waters of the Missouri, crossed over the water-shed, and descended, first of white men, into the tributaries of the Columbia. We may well, in this connection, refresh our memory by turning to their narrative.

Since the days of Lewis and Clark our maps have borne the names which they attached to the mountain-streams —Jefferson, Madison, Gallatin, and Dearborn, the president and secretaries of the National Government in the

time of these explorations; and the map which they gave us (poor as it now appears) remained for half a century our most complete, I may almost say our only original portrayal of the region. Then came, in 1853, the Pacific Railroad surveys of the General Government, conducted in this part of the country by Gov. I. I. Stevens. A little later, one of his chief collaborators, Capt. Mullan, U. S. A., was detailed to construct a military road from Fort Walla-Walla, on the Columbia, to Fort Benton, on the Missouri,—a work which occupied him from 1858 to 1862,—and now the actual construction of a railroad has already been begun. The task of Capt. Mullan occupied him four years, when a wagon-road of 624 miles was completed across the Rocky Mountains.

The summer of 1871 has thrown a vast amount of light upon the Montana passes; four parties, besides that of the engineer-in-chief, Gen. W. M. Roberts, having been engaged in investigating this group of mountain-entrances. To understand their work, two points of departure must be kept in mind,—the town of Helena, Montana, or, better yet, a point a little south of it, where those two well-known streams the Gallatin and Jefferson come together. The second point of departure is the junction of the Deer Lodge and Little Black Foot rivers, on the western slope of the Rocky Mountains. We may term these departures One and Two.

One of the parties of the Northern Pacific Railroad last summer went up from Departure One, along the easternmost of the three Missouri affluents,—the Gallatin, over the Bozeman Divide, and so into the Yellowstone; a second from the same departure went up the western affluent, the Jefferson, over the Deer Lodge Pass, and so down to the Departure Two; a third party, starting from Departure Two, proceeded down the Hell Gate and Missouri Rivers, into the Bitter Root Mountains, and so to the Jocko river; a fourth party examined the Lower Dearborn valley to its union with the Missouri,

and then westward up the Dearborn valley, examining the passes known as Cadotte's, and Lewis and Clark's, and going over the mountains to Departure Two.

Gen. Roberts made a personal examination of eight passes between Cadotte's, on the north, and Deer Lodge, which is about eighty-five miles south in an air-line; and his observations led him to order an instrumental survey of the most promising pass, "Ten-Mile Pass," from the initial point on the Deer Lodge, over the pass, and so down to the Missouri, a few miles north of Helena.

Meanwhile other parties were at work between Montana and the Pacific, farther west; one going up the Clear water toward the summit of the Bitter Root range, and afterward, going down the Snake River from Lewiston; a second party surveyed from the summit of the Cascade down the Yakima to the Columbia; a third party were at work on the "Forty Miles," beyond the Cowlitz residency, and a fourth was engaged to make a reconnoissance from the Columbia River, near Lake Chelan, towards the Pend d'Oreille country.

Besides all this work, the engineer-in-chief made an instrumental reconnoissance of the Yellowstone valley.

The results of such a number of investigations are obviously important. They involve several points of interest. First, the best approach from the east to the Rocky Mountains, is it the Missouri or the Yellowstone? Second, in either case, what is the best way over the Rocky Mountains? or, in other words, which one of eight passes, in a region of nearly 100 miles long, is to be preferred? Third, what is the best way down the Pacific slope to the valley of the Columbia,—is it the Mullan wagon-road or some other way? Fourth, the best route down the Columbia valley, and, finally, the structure of the Cascade Mountains? On all these points the company has secured, by the work of last summer, detailed information (for which in due time the world will be wiser); but it is not quite ready to publish it.

Gen. Roberts comments on the productiveness of Montana like most other persons who have been there. He says that the soil in the valleys and on the slopes of the foot-hills excels in productiveness any region where he has dwelt, excepting Oregon and Washington.

He anticipates that the road will be open to the Missouri in the fall of 1872; that it may be extended to the Yellowstone in 1873. During 1875 the line could be graded, and the track laid over the Rocky Mountains to meet there the line from the Pacific, if that end of the track should be completed with equal despatch.

One of the subordinate surveys carried on, under the auspices of this great corporation, during the past year, was conducted by Gen. T. L. Rosser, from the Missouri River, at Fort Rice, to the Yellowstone, by the way of Heart River and Glendive's Creek, a distance of 226 miles. As it happened that I was at Fort Wadsworth, D. T., on that lofty plateau which is called the Coteau of the Prairie, when a part of the escort for Gen. Rosser's party went forth last summer, and thus heard from the leader of the expedition an account of the problems to be settled and the difficulties to be encountered, I have looked with much interest for the publication of the results of their summer's work, and have been favored with an early copy of it. Much apprehension was felt lest the Indians, who watch with jealousy what we call the advance of civilization, should attack the survey, and so a strong escort was fitted out under the command of Gen. Whistler. No trouble was given by the Indians, except the burning of the grass, which would have been useful as forage.

The party reached the mouth of Heart River September 11th, and proceeded at once to survey it. They soon reached the Heart Butte, the deserted seat of Black Feet's empire, and, a few miles west, came upon a field of coal which was thence continous to the Yellowstone. In several places the coal was burning, and appeared to have been

doing so for years. At the top of the ridge which divides the waters of the Heart and the Little Missouri, the Mauvaises Terres were first seen, and appeared to be an insurmountable obstacle; but soon a water-course descending into the valley was discovered. The stream running through this valley he named Dave's Creek; its waters are strongly alkaline, the timber chiefly cotton-wood, and "very scattering." From Dave's Creek the party went over into the valley of the Little Missouri, a tortuous cañon, the walls of which are some five or six hundred feet high. The bluffs in many places show advantageously the peculiar geology of the Mauvaises Terres. Running down this stream five miles, he reached Andrew's Creek, and ascended it to the prairie level, from which he descended again to Inman's Fork, one of the tributaries of the Little Missouri. Beyond this fork is the divide between the Little Missouri and the Yellowstone. Glendive's Creek led the party down to the valley of the Yellowstone; the stream being here 1,000 feet wide, the valley about two miles. A map and profile of the regions were prepared by the topographers, Messrs. Meigs and Eastman.

It is greatly to be desired that the gentlemen who are in charge of this national undertaking will find an opportunity to give to the public the scientific results of their recent surveys, and especially that the measurement of altitudes and distances in regions where a road is not finally located will be preserved and published for the benefit of future inquirers.

V. THE YELLOWSTONE GEYSER REGION.

No portion of our national domain has of late been regarded with so much curiosity and surprise as the region of geyser and hot springs, which has been brought to light near the sources of the Yellowstone and Fire Hole rivers, just east of the divide between the Missouri and the Columbia. So remarkable are the narratives of the visitors to these regions that a bill is now pending in

Congress to reserve from settlement, under the name of a national park, the tract in which the most surprising of the phenomena appear. It is satisfactory to know that the bill will probably become a law.

On the latest-published maps of the Engineer Department, the courses of the Upper Yellowstone and the Fire Hole rivers are faintly delineated; but on the map of Mr. De Lacy, Surveyor-General of Montana, the local nomenclature and the approximate courses of the rivers are more fully brought out; and on the two maps which, by the courtesy of the engraver, Mr. Julius Bien, of New York, I am able to bring before you, the exact position of the principal geyser and hot springs is indicated. These two maps were drawn by Mr. E. Hergesheimer, of the United States Coast Survey, at the instance of Dr. F. V. Hayden, to illustrate his report upon the region. The substance of this report, with reduced copies of the map, will be found in the *American Journal of Science* for February and March, 1872.

In connection with this report of Dr. Hayden's, reference should be made to the early story of the Washburne-Langford party, which was printed in *Scribner's Monthly* for 1871, and which gives a very graphic account of the region; to a narrative by Walter Trumbull, in the *Overland Monthly;* and to the report which has been published in full by various newspapers, within the last few days, of the expedition of Capt. Barlow, of the United States Engineers, which visited this region in the summer of 1871. The survey of Gen. W. Milnor Roberts, already referred to, began at a lower point upon the river, east of Bozeman's Pass, and continued towards the Missouri, and Gen. Rosser touched the river at a much lower point.

VI. The Ninth Census of the United States—1870.

During the past twelve months the publication of the results of the ninth census of the United States has been commenced, and we have before us now the advance

sheets of the Statistics of Population by States and Territories, both in the aggregate, and as white, free-colored, slaves, Chinese and Indian, at each census. We have also the Report of the Superintendent of the Census, Gen. F. A. Walker, on the conduct and results of the work entrusted to his charge. Although the law of Congress under which this decennial enumeration was taken is far behind the requirements of modern statistical science, its execution was entrusted to an excellent officer, and the results may be received with great satisfaction and confidence.

But as this Society no longer recognises the statistical side of geographical inquiry, I do not feel at liberty to dwell at length upon this topic, and indeed I should hardly have introduced it at this time were it not for the sake of presenting to you some of the results of the census in a very clear and instructive cartographical aspect. It is fair to presume that you are still interested in the geographical side of statistical inquiry.

The manuscript maps which I now hold before you were prepared under Gen. Walker's direction in the census office, as examples of the mode by which the results of the census may be exhibited on maps. These very maps are soon to be presented to the appropriate committee in Congress, in the hope that their publication will be commended, and that other kindred maps will be prepared and given to the public under the supervision of the Census Bureau.

These maps are seven in number.* I hold up first a map of Alabama, which shows at a glance in what part of that State the Africans preponderate, a series of tints being employed, as you observe, which are darker in proportion as the number of Africans increases. Now, it would take a long time to discover from a column of

* This portion of the Address was given *ex tempore* as the speaker turned to the maps, and was reported with difficulty.

figures the fact which you here see at a glance; that through the middle of the State, from East to West, there is a black belt where the colored people are most numerous. No alphabetic list of counties would suggest that fact, or enable us to surmise the reason. It would perhaps have been better if the structure of the country had been more fully delineated, for here we have only the water-courses. An exhibition of the altitudes of the State would have been a desirable feature.

Here is a similar map for the entire Southern sea-board, which exhibits the distribution of the Africans, not county-wise but State-wise. You see here at a glance that the blacks preponderate in South Carolina. Louisiana stands next. Then comes Virginia, North Carolina, Texas, Arkansas, Tennessee, Maryland, Kentucky, and so on. Underneath this map hangs a map of the same series of States, exhibiting the same class of facts ten years previous, when the census of 1860 was taken, and these two maps, if compared, will show the effect of emancipation upon residence. Here you see South Carolina, in the present census, is the darkest. So it was in 1860. Georgia and Alabama stood second ten years ago. They stand third now. Louisiana stands second, and Mississippi has entered the same grade as South Carolina, when, ten years ago, it stood below. Texas, which was ten years ago fourth in rank, is now the fifth.

Here is another map which exhibits the distribution of foreigners at the South; on it we see that the foreign born population is thickest, where the Africans are not, and *vice versa*. South Carolina, which was darkest before, is lightest now. Missouri, where the Germans have so largely gone, stands foremost. West Virginia and Kentucky are alike. Texas corresponds with Delaware. In the South-east is a region where very few foreigners have gone; more to Florida than Georgia, more to South Carolina than to North Carolina. Here we have the Northern States, a map of the former free States,

showing the proportion of foreign to total population. You observe how the line of emigration has been through the North; and it is very curious that of people coming in from Europe, the densest population is found farthest from the sea-coast. They are pressing into Minnesota, the State which has the largest proportion of foreign born people. Wisconsin stands second. New York third, corresponding with Nebraska, and with Massachusetts; Connecticut is fifth; then comes Illinois and New Jersey, and Iowa; and Maine is eighth, corresponding with New Hampshire and Indiana. Here we have another map, exhibiting the proportion of blacks in the Northern States. You see that a State where they cling most decidedly is Kansas. New Jersey next. Ohio next. The Southern tier, you see, has their company more than any other. The last in rank is Minnesota, where we saw before that the foreigners most abounded.

This map (showing another), although you can hardly see it across the room, is to me the most interesting of all; first, because it is a map of the whole country; and second, because it is prepared with special study and care.

It is intended to show us in what parts of every State the German element is most abundant, and then by making a deduction for this preponderance in certain regions, to show what is the average distribution in the remainder of the State. Notice, for example, in Missouri the preponderance of Germans in the St. Louis region, and their comparative scarcity in South-western Missouri. See in New Jersey the marked ascendancy of this element in Hoboken and Jersey City, and their vicinity, while in the State, as a whole, the German element by no means preponderates.

But I will not dwell longer upon these instructive diagrams, for they were not designed to be shown to so large an assembly. The interest, however, which you manifest in them, leads me to express the hope that the Society, as individuals and as a body, will exert what influ-

ence they can rightly bring to bear upon Congress, to secure the publication of some such diagrams as those which you have before you.

As an example of what may be done in this graphic mode of representation, let me call your attention to a beautiful series of printed maps, which the Prussian government has recently printed. I refer to the atlas entitled *Der Boden und die landwirtschaftlichen Verhältnisse des Preussischen Staates, nach dem Gebietsumfange vor* 1866, *von A. Meitzer*,—a work in which, with great clearness, accuracy, and beauty, the territorial divisions, the geographical and geological structure of the country, the density of the population, the wealth, taxation, distribution of industries, etc., etc., are cartographically presented.

VII. Proposed American Explorations in the East.

It is a little beyond the scope of this discourse to speak of work projected by our countrymen, especially in other lands, but the great importance of the plans to which I am about to refer will certainly justify the reference.

The admirable purposes and results of the Palestine Exploration Fund of London are well known in this country, but hitherto very little effort has been made to enlist the coöperation of our countrymen in their important efforts to thoroughly investigate the land of the Bible. At first this seems a little strange, for the Americans were pioneers in the field of inquiry, and since those epoch-marking researches of Dr. Edward Robinson, and his learned associate, Dr. Eli Smith, several of our countrymen have made important contributions to the geography of the East. In Palestine alone the researches of Lynch, W. M. Thomson, Barclay, Osborn, Hackett, Wolcott, Johnson, and many others, are especially noteworthy. A plan of coöperation has lately been proposed by which Americans can help forward the work of Syrian exploration more effectually, it is thought, than by contributing

to the English fund. A committee has been formed in New York, made up to a great extent, of persons who have travelled in the East; and it is purposed to collect a sum of at least $10,000 to be expended by this committee upon some limited region where the English are not at work, thus supplementing their investigations. The Archbishop of York has written to the president of the American committee, Dr. Jos. P. Thompson, expressing the satisfaction felt by the English committee of which he is chairman, at the formation of a committee in New York, so that no apprehension of rivalry or reduplication need be anticipated. Dr. William M. Thomson of Beyrout, has made a recommendation which the New York committee adopts, that the field of exploration be the region east of the Jordan Valley and the Dead Sea; if possible also, Hermon, the Lebanon, and the plains and valleys of Northern Syria. He suggests Kerak, southeast of the Dead Sea, as the first station for the Moabite region, and thence he would have the survey continue through Gilead and Bashan into the east region of the Hauran.

No one can doubt the fruitfulness of this field in geographical and archæological respects. To secure the harvest, only money is needed; services of competent men will then be engaged as explorers, equipped with all the resources of modern science. Certainly in a plan like this, the American Geographical Society must take a deep interest.

Mr. President: My hour is gone; my task is done. Let us hope that the current year will be as full of good results as that which we have reviewed.

III.

NOTES ON GIOVANNI DA VERRAZANO AND ON A PLANISPHERE OF 1529, ILLUSTRATING HIS AMERICAN VOYAGE IN 1524, WITH A REDUCED COPY OF THE MAP.

By James Carson Brevoort.

READ NOVEMBER 28TH, 1871.

Introductory.

The discoveries made in the great ocean by Columbus at the close of the fifteenth century, gave to the Spaniards a supposed claim not only to coasts and islands which they had seen, but also to *all* the unknown lands and seas *beyond* and to the west of a certain meridian of longitude. This demarcation line, however, was not based on any better right than the partition of the heathen and undiscovered countries of the globe between Spain and Portugal, confirmed by the Pope, Alexander VI, in May and September, 1493,* and further, but not definitely settled between these two nations in June, 1494. As time passed on, the hopes entertained by the Spanish sovereigns were dispelled by the assurance that the western waters did not anywhere, as supposed by Strabo,† afford a clear seaway to the eastern shores of Asia, for a

* See Humboldt, *Examen Critique* and *Cosmos*; also Oscar Peschel, *Die Theilung der Erde*, etc., 1871.

† While the mathematicians teach that the circle passes behind it (the earth) and returns into itself, so that did the magnitude of the Atlantic not prevent, we might navigate on the same parallel from Spain to India. [Lib I.]

new continent interposed itself, which up to 1524, had been found continuous from Florida to the distant southern strait discovered by Magellan.

In 1513, Balboa discovered the South Sea, thus revealing a probable division of the New World into a southern and a northern continent, which last was, however, supposed to be a part of Asia until 1540. The South Sea was thus named, because it was supposed to lie to the south of this eastern extremity of Asia, and on many maps of the time, it was thus represented. The probability, however, of the existence of a narrow strait or water communication between the South Sea and the Atlantic, just north of Mexico, was a favorite theory among geographers, long believed in, leading to many voyages for its detection, and which, as a search for a north-west passage, survived to this day, when having been found, it turns out to be impracticable.

It was the hope of making such a discovery that impelled the navigator, whose voyage we are about to examine, toward that part of the New World which still remained unexplored, and we shall briefly review the geographical discoveries which, up to the year 1524, had been made from the north and from the south, along the coast of the present United States of America.

In 1513, Juan Ponce de Leon discovered the mainland of Florida, and afterwards sent out exploring expeditions along its Atlantic coast, which do not appear to have got beyond the mouth of the Rio de Chicora, or Savannah River, in latitude 32°. He died in 1521 from a wound received on his last voyage while fighting with the natives.

The Licentiate, Lucas Vasquez de Ayllon, in 1520 and 1521, explored the coast north of the Savannah, and appears to have reached Cabo Santa Helena, or Cape Fear, in latitude 34°, and somewhat beyond it. It is claimed by some that his vessels had reached to the Bahia Santa Maria, or Chesapeake Bay, before 1526, the date of his last expedition. The coast-line of the Gulf of Mexico

was slowly explored from 1498 to 1518, when the hope of an opening into the Mar del Sur was abandoned.*

The coasts of Newfoundland, or Baccalaos,† and of Nova Scotia, or Terra de Bretones, had been explored by the French and others on fishing voyages, at least as far south as Cape Sable, or to the Penobscot (Rio de Norumbega), in latitude 43° 20′, before 1524. These explorations from the north and from the south left a gap between latitudes 34° and 43° north, which the geographers of the Congress of Bajadoz, in 1524, seemed unable to fill, having discovered that no official examination of the coast between Florida and Terra Nova had ever been made.

The hearsay report of Sebastian Cabot, who was said to have followed the coast from Newfoundland to Florida without finding an opening to the west, does not appear to have had any influence on the question. He was himself one of the members of this Congress, and could have cleared up this point if he had really coasted these shores in 1497 or 1498, as told by Peter Martyr. ‡

Estevan Gomez,§ a Portuguese, in Spanish employ, who had accompanied Magellan as far as the strait, a member of the Congress, and who had proposed a search along this unexplored coast, was therefore officially commissioned to look for a passage westward between these parallels. He sailed in February, 1525, and was absent about ten months, coasting from north to south, having distinctly ascertained that a continental shore filled the void, thus completing the line of an impenetrable barrier across a westward route to the Spice Islands, extending from latitude 53° north, to the Straits of Magellan, in 54° south.

The return of the Vittoria in 1522, under Sebastian Del Cano, the only ship left of the five which had sailed

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* See note, *Gulf of Mexico.* † See note, *Baccalaos.*

‡ See note, *Cabot.*

§ A full account of the voyages of this navigator has been prepared, and will soon be published, by the Hon. Henry C. Murphy.

in 1519 with Magellan, led to much speculation concerning a nearer way to the Moluccas than the one thus opened by the Spaniards. Many minds were excited, both by this great feat, and by the reports of the rich empire which Cortes was then conquering, to new geographical enquiry. Cortes himself offered, in 1524, to search both oceans for the supposed northern strait leading to the west, though it appears that he confined himself to exploring the South Sea only.*

Meanwhile the attention of Francis the First was turned in the same direction, whether from the report that such a blank was to be filled in the maps, or that the French king had learned as much from his own cosmographers. That he hoped to find a short passage to the Moluccas, we know from the letter of Giovanni de Verrazano of 1524, who had been directed to search for it. Perhaps among the crews of the vessels captured by this navigator on previous corsairial expeditions, there were men who had revealed to him the state of Spanish geographical knowledge, and the probability of a western passage, to be found between the parallels above mentioned. It was also no doubt the desire of the king to discover a rich empire like Mexico, which the Spaniards were then plundering, and which might open to *him* also a supply of the precious metals. Verrazano seems to have failed in a first effort to sail, with four vessels, as he says, northwardly, but with one vessel only he started again, and after an exploration of some months, between the parallels of 34° and 50° N. according to his own estimate, he returned with information that no passage could be found.

The explorations of Verrazano and of Gomez on the eastern shores of North America, and those directed by Cortes on the west, closed all hopes of a short sea-way to the Indies. But the entire disconnection of Asia with America was not positively proved until Behring discovered in 1728, the strait to which his name was given.

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* See notes, *Cortes* and *Zuazo.*

Discovery of the Verrazano Planisphere of 1529.

The interesting discovery by Mons. R. Thomassy, an experienced archivist, author of interesting geographical papers and of the geology of Louisiana, among the maps of the College *de Propaganda Fide* in Rome, of a Mapamundi, made by a certain Hieronimus de Verrazano, dating from about the year 1529, was first made known in a paper entitled *Les Papes Géographes*, published in the *Annales des Voyages*, Paris, 1852.* Mons. Thomassy could hardly have been aware of the keen interest that such a discovery would awaken among those interested in early American explorations, or he would have given a less meagre account of this precious map. He deserves our sincere thanks, however, for drawing attention to this and other valuable geographical monuments preserved in Rome, and which seem to have escaped the active research of Humboldt and Jomard. A study of this map by the author of the *Examen Critique de la Géographie du Nouveau Continent*, would have been fruitful of results, and we can hardly venture to tread a path which he first opened, without great diffidence, and the hope that the investigation which we may only sketch out, will by others be prosecuted to definite results.

Our remarks are based upon a study of two photographic copies of the original map, which, after long and repeated attempts, have at last, through the kind offices of Mr. Thos. E. Davis, been procured from Rome by the President of this Society.†

These photographs are now before you, but are unfortunately not distinct enough to enable us to read the names inscribed along our coast, between the points which limit the explorations of our navigator. This is most unlucky, and another copy must be procured before the critical examination of the subject can be properly

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* See note, *Thomassy*.

† See page 80 of the Report of this Society for 1871.

undertaken. We have deciphered a few of the names, and have prepared a careful copy of that part of the Mapamundi which more specially interests us as Americans.

The original map is on three large skins pasted together forming a sheet, according to Mons. Thomassy, the first describer of the map, 260 centimetres long and 130 high; say 102.36 inches by 51.18 inches, or with a width twice as great as the height. It is a general map of the world, as known to the designer of it, Hieronimus de Verrazano, but it bears no date. From the remark written under the name Nova Gallia, that this land was discovered five years before, we infer (supposing the date of Giovanni de Verrazano's voyage, as given himself, to be 1524), that the map was made in 1529. There is good reason to believe that Hieronimus (Jerome) was a brother of John, and that he put down the coast here alluded to from authentic data furnished by his brother.

There are certain coast features drawn on the map, which are not alluded to in the letter, seeming to prove that Jerome had his brother's charts before him. The plain indication of Long Island Sound, and of Cape Cod, is of itself sufficient proof that it was compiled from original drafts or notes. The latitudes, however, differ entirely from those given in the letter. The truth, perhaps, cannot be developed until this chart, which is open to examination, has received a closer study. New copies of it are needed, which may more faithfully render the coast names and minor details.

Further remarks on the map will be found in the notes to this paper.* The great interest that attaches to it, in our eyes, is the fact of its being the earliest known tracing of our coast, as made from actual exploration.

The only account of Verrazano's voyage left to us is in the form of a letter, written from Dieppe, July 8, 1524, to

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* See note, *Verrazano Planisphere.*

the French king, in which he gives a short and sketchy report of his explorations, without naming any points, and in such general terms that many have doubted the genuineness of the letter. It was not published in France, but first appeared in Italian, in Venice, 1556, in the third volume of the *Collection of Voyages*, edited by Ramusius, which was prepared in 1553, but no document positively confirming the letter has since been found.

No serious doubt, however, had ever been raised impugning the truth of this letter until the late Buckingham Smith attempted, in two critical articles, published in 1864 and 1869, to disprove its genuineness.

Life and Voyages of Verrazano.

Geographers, as well as historians, meet with many historical riddles. Even concerning Columbus, much remains to be explained, and of the early voyages of Sebastian Cabot just enough is known, in the lack of further documentary evidence, to render the search for truth almost hopeless. The voyages of Americus Vespucius present a wide subject for controversy, and the few facts concerning Verrazano, whose voyages more closely than any other early navigator relate to our own coast, invite the most searching criticism of geographers.

We have, in this case, to deal with an individual who was known under two characters, as a privateer and as an explorer. On this account we must treat of him in each character separately, in order not to confuse the narrative of his career. In later times, a Hawkins or a Drake, a Cavendish or an Anson, united these opposite occupations and were famed in both, but Verrazano's exploits as a corsair have been hitherto only alluded to in scattered notices, and uncertainty rests on the time and manner of his death. He was the first to show how the growing power of Spain could be crippled, and Spain, in return, has not honored his memory.

We have collected many detached notices of his cors-

airial employments, and have endeavored to partly clear up the mystery of his death.

FAMILY OF VERRAZANO.

The Verrazano family belonged to Florence, and our navigator, according to Giuseppi Pelli,* was the son of Pietro Andrea and Fiametta Capelli. From the letter of Annibale Caro, quoted by Tiraboschi,† we learn that he had a brother, probably Hieronimus or Jerome, who composed the map before us. According to Prof. Geo. W. Greene, the Cavaliere Andrea, the last one of the family died at Florence in 1819.

Pelli supposes that Giovanni de Verrazano was born after 1480. This date, together with the fact that he had resided several years in Cairo and Syria,‡ form the substance of all that can be ascertained about him in Italy. Engaged in the trade of spices, silks and the precious commodities of the east, which were slowly brought, after numerous barters, to the ports of the eastern Mediterranean, where vessels from the trading cities of Italy awaited them, our navigator learned what a gain it would be, if these necessary commodities could be procured by a direct sea voyage to the Moluccas.

At what time he became a seafarer and on what seas he sailed previous to the year 1521, we have no information, unless we accept the vague indications contained in Carli's letter. The late Buckingham Smith ascertained, from Portuguese authorities, that he was in the East Indies in 1517, probably making the voyage in a Portuguese vessel. Possibly, after an experience of some years in the Mediterranean, the cradle of European nautical enterprise, he may have entered the service of Spain, who at that time was drawing soldiers and sailors from every part of Europe, and in her service must have

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* See note, *Pelli, Elogio de Verrazano.* † See note, *Caro.*
‡ See note, *Carli's letter.*

learned the track followed by her vessels for trade or conquest to the West Indies.* Nay, he may himself have sailed to the West Indies, as it seems he did with the Portuguese to the Moluccas. The route to the latter by the Cape of Good Hope, was discovered in his time, and the quite recent oceanic discoveries of the Spaniards, seeking the far east by the west, must have further excited his ambition, and increased his desire to open a still shorter water communication with Cathay and the lands of the great Khan.

In 1521, Verrazano appears as a French corsair off the southern shores of the Iberian peninsula, and thenceforward Spanish historians make frequent mention of him under the name of Juan Florin or Florentin, never, however, adding the surname Verrazano.

VERRAZANO AS A CORSAIR.

As a corsair, his exploits have hitherto been known only from a few passages in Barcia† and Herrera, while, curiously enough, the letters and decades of Peter Martyr‡ and the history by Bernal Diaz, § which contain dates and interesting details relating to these incidents, seem to have been overlooked. The late Buckingham Smith, who wrote several notices of him, and was engaged upon another at the time of his death, was about to explore this field.

A distinct reference to his predatory cruises against the Spaniards is made by Juan himself, in the heading of his letter to Francis the First, which identifies him with the feared Juan Florentin, the corsair. ‖

We might otherwise hesitate to accept the fact, which

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* See note, *Routes to the Indies.*

† *Ensayo Cronologico para la Hist. gen. de la Florida. Madrid*, 1723.

‡ *Opus Epistolarum, Compluti (Alcala)*, 1530, *and Paris*, 1670; *Decades de Orbe Novo, Alcala*, 1530. *Paris*, 1587.

§ *Historia Verdadera, etc. Madrid*, 1632.

‖ See Appendix, *Identification of Florin as Verrazano.*

is stated by Barcia alone. Other Spanish authors, such as Herrera, speak of the explorer Verrazano, as if he were a distinct character.

Soon after the gold-producing islands of the sea had been discovered and made productive by the Spaniards, corsairs of various nationalities began actively to dispute the rich spoil of these new Indies with their grasping conquerors. These corsairs watched the south-western coasts of the peninsula, and no doubt many a rich capture was made by them before Juan succeeded in his daring project of lying in wait to seize the treasure-ships of Cortes.

The first gold from Mexico, together with curious specimens of the handicraft of the natives, collected by Juan de Grijalva in 1518, was sent to Diego Velasquez, the governor of Cuba, in charge of Pedro de Alvarado; and the king's share was received in Spain early in 1519. The first treasure collected by Hernando Cortes, who landed in Mexico in 1519, was despatched direct to Spain,* the vessel sailing from Villa Rica de Vera Cruz, July 26, 1519, in charge of Alonzo Hernandez de Puertocarrero and Francisco de Montejo, and arriving at San Lucar in October,† after a short stoppage in Cuba.

The king, however, was at that time in Flanders, and the treasure was not presented to him until March, 1520, at Tordesillas.‡ No doubt, the news of this rich arrival was at once noised abroad, and led to the fitting out of corsairs by France, in order to share in the golden harvests of the Spaniards.

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* The vessel was carried by Alaminos, her pilot, through the Florida channel (reconnoitered by him in 1513, while accompanying Ponce de Leon), in order to avoid passing near Cuba. It was the first voyage to Spain made by this route.

† See Peter Martyr's letter of December 2d, 1519.

‡ A more correct account, by an unknown hand, given in the *Documentos Ineditos* vol. i, 1842, p. 421, says that the first things sent by Cortes were presented to the emperor, in Valladolid, during holy week (April 1–6), 1520.

Another consignment of gold from Hispaniola, according to Peter Martyr,* fell into the hands of Juan Florentin in 1521, being his first recorded capture of treasure. Peter Martyr estimates the value of this prize at 80,000 ducats, besides a large quantity of pearls and sugar.†

As Cortes despatched his vessels directly home, without permitting them to stop at any of the West India islands, and as this vessel was from Hispaniola, it seems certain that it was not sent by the conqueror of Mexico. Barcia gives the same date, but the ship he speaks of was taken in 1523.‡ Bernal Diaz does not speak of this vessel's capture, as it was not one sent by Cortes.

Herrera‖ gives, perhaps, the most reliable account of the doings of the French corsairs in this year. He says that these corsairs were cruising on the coasts of Andalusia and the Algarves, watching for vessels from the Indies. Four or five vessels were therefore ordered to be fitted out at the cost of the foreign merchants, and the command of them was entrusted to Don Pedro Manrique, brother of the Conde de Osorno. Two of them were commanded by Estevan Gomez and Alvaro de la Mesquita. The first of these was a pilot under Magellan, and had abandoned his commander October 8, 1520, when partly through the strait, imprisoning Mesquita, his nephew, captain of the San Antonio. They had reached Seville, May 6th, 1521, and while awaiting the issue of their dispute were thus ordered into service.

Just as they were about to sail, news was brought that the French corsairs had taken two out of three caravels coming from the Indies. The third, with the smaller part of the treasure, was said to have escaped. It was

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* See his letter of November 19, 1522, and decade v, chap. 8.

† See notes, *Martyr*, Dec. v, chap. 8. His letter of March 6, 1521, mentions the arrival of a despatch, and speaks only of treasure expected.

‡ *Ensayo*, 1723, page 8, see note, *Barcia*

‖ Dec. III, Lib. I, Cap. XIV, 1521

added that the corsairs were watching to make the capture of five expected Portuguese vessels.

A light vessel was therefore sent to the Azores to warn these of the danger they were in, and the convoy then started in pursuit of the corsairs. It found, on the 24th of June, seven French vessels anchored under Cape St. Vincent, which came out to meet it and gave battle. The French retired at last, and were chased all night, but in the morning turned on their pursuers. Manrique got the wind of them, when they again fled, and were chased forty leagues. He recaptured a prize loaded with wheat, and another with artillery and arms, and took all the small boats of the French.

Manrique returned to San Lucar to repair damages, hastening matters by a forced levy on the merchants, as he wished to join a Portuguese fleet, going to the islands to convoy the vessels from Calcutta.

Having waited at the islands until August, it became certain that the five ships would not arrive this year from the east, so Manrique left the Portuguese fleet there, with supplies for the expected vessels, and cruised on the Spanish coast, having learned from a vessel plundered near Galicia, that twenty-six corsairs had been seen in one place and twenty in another.

It appears, therefore, that the French corsairs were very active in this year, but Herrera does not mention Florin as a commander of any of them. Martyr alone names him, and we depend upon his authority only. No captures of treasure-vessels are reported as having been made after the month of May. No doubt the treasure taken early in the year was at once sent home, probably to La Rochelle, which appears to have been the place where Juan had been fitted for the cruise.

The coast of Andalusia, between Gibraltar and Cadiz is high and indented by wild and sterile valleys, then almost uninhabited, and the pirates would lie there, watching from the heights for approaching vessels, which

habitually sighted Cape Trafalgar on their return from either of the Indies. On this account homeward-bound vessels, about 1524, were ordered to make for the port of Corunna.*

During the rest of 1521, or in 1522, Verrazano may have attempted the first voyage of discovery alluded to in his letter to King Francis, but of this we shall speak further on.

On this first cruise he says he had four vessels, and the expression in the preamble to the letter, "*that which had been accomplished by the four ships*," alludes, no doubt, to the rich spoil he had taken from the Spaniards in 1521, as well as to the attempt to sail to the north-west. This supposition finds confirmation in the same heading of the letter, where, in allusion to another cruise, the words "*what we did with this fleet of war*" seem to refer to his great capture of 1523. He was not making open war on the Spaniards, and had, no doubt, been instructed to conceal all mention of any aggressive acts toward them.

In 1522, he seems to have made an unsuccessful cruise, at least if we can believe Viera, the historian of the Canaries,† who, writing in 1772, seems to have neglected the authors we have quoted, but derives his information on the subject of Verrazano from the MS. history of Don Pedro Augustin del Castillo, preserved in Teneriffe. In this year, as he says, the governor of these islands, Pedro Suares de Castilla, ordered a squadron of five small vessels to seek for the corsair. It met him off the Punta de Gando, with seven captured emigrant vessels, which he had taken while on their way from Cadiz to the islands. He was chased and forced to release his prizes, which seem to have been of little value. Viera adds that he betook himself to the Azores, and there captured two treasure-ships of Cortes, but this occurred, as we shall see, in 1523. It is uncertain whether he returned in 1522

* See notes, *Martyr*, Dec. 8. † See notes, *Viera*.

to France, or remained in Spanish waters. Martyr,* in 1522, records a rumor that the French pirates had fifteen ships, and that many of them were cast away on the coast of Africa. This report may have been a garbled version of the story told by Viera.

On the 15th of May, 1522, Cortes despatched his third letter to the king, dating it from Cuyoacan, near Mexico, after the capture of the capital. The consignment accompanying this letter comprised in treasure, jewels, rarities and live animals, the most valuable collection hitherto sent from the Western Indies to Spain. It included the emperor's fifth, a present from Cortes and his men to the monarch, and consignments to individuals. Two of the three vessels bearing this precious freight were in charge of Antonio de Quiñones and Alonzo de Avila, Diego de Ordaz and Alonzo de Mendoza, while Juan de Ribera, the secretary of Cortes, was made the chief envoy, and entrusted with the despatches and the presentation of the imperial share of the treasure, borne on the third vessel.† A glowing description of the treasure and curiosities can be found in some detail in Martyr, Oviedo, Gomara, Herrera and other Spanish historians.

According to Bernal Diaz, these vessels left Vera Cruz on the 20th of December, 1522. This date is erroneous, and although we do not know the exact day of their departure, it was made, probably, in June, 1522. They passed into the Atlantic through the channel of the Bahamas, piloted, as before, by Antonio de Alaminos, the discoverer of this passage.‡ One notable event of the voyage was the escape from its cage of a tiger, which killed and wounded several sailors. The little fleet put in at the Azores, where two of the vessels, fearing corsairs, concluded to remain, and actually stayed, over the winter,

* Dec. 5th, chap. 8.

† According to Martyr. Herrera, Dec. III, Lib. III, Cap. I, is confused on the subject.

‡ See notes, *Gulf of Mexico.*

but the third, bearing Juan de Ribera and a small part of the treasure, continued the voyage and reached Spain in safety. The treasure had been long expected, and Peter Martyr says, in a letter of July 14th, 1522, that the vessels had been sighted off the coast, but this proved a false report. In his letter of November 19th,* he speaks of Juan de Ribera's quite recent arrival. Tired of waiting at the Azores, Diego de Ordaz and some others also reached home safely, in a Portuguese vessel.

In 1523,† the Council of the Indies, either of its own accord or acting on a decree of the emperor, had instructed Capt. Domingo Alonzo to convoy a fleet of East Indian bound vessels as far as the Canaries,‡ and then repair to the Azores, with his three caravels, and convoy the Mexican vessels home. The rich convoy sailed from Santa Maria, of the Azores, about the middle or end of May, 1523. It consisted of the three vessels of war, the two treasure-ships of Cortes, and of another treasure-ship from Española. When the fleet were just about to sight Cape St. Vincent, and were thirty-five geographical miles (ten Spanish leagues) from it, a fleet of six vessels was descried coming to meet them. Probably they were mistaken for Spanish vessels, and were allowed to come close aboard; at any rate, the strange fleet attacked them, proving to be armed French corsairs, fitted out from La Rochelle, and under the command of the dreaded Juan Florin himself.

One of the Spanish caravels took to flight; the others fought bravely, but were overcome and forced to surrender with their convoy, Antonio de Quiñones being killed during the action. § The date of the capture is not given,

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* See notes, *Martyr*, *Contarini*.

† See notes, *Martyr*, Dec. VII, Cap. IV; and also *Cortes de Valladolid*, 1523.

‡ These were the first Spanish trading-vessels bound there, the Vittoria, under Sebastian del Cano, having returned a few months before, viz., September 6th, 1522.

§ See note, *Herrera*, 1523.

but Martyr's letter concerning it was written June 11th, 1523, and Contarini's on the 7th, probably within a week of its occurrence.* Curiously enough, there is no distinct mention of it in the decades of Peter Martyr, though he speaks of it in 1525 as an event that happened three years before. The two treasure-ships were taken, and Herrera and Gomara include the ship from Española, also. With this great prize, perhaps the largest made up to that time, and with Davila a prisoner, Florin got safely home to La Rochelle. Davila was kept a prisoner there for three years. A portion of the treasure was laid at the feet of Francis the First.

Charles felt the loss deeply, and soon afterward issued a second order,† of wider application than the first one of 1523, and the Council of the Indies thereupon ordered that all homeward-bound vessels should rendezvous at Hispaniola, in order to be convoyed safely home. Contarini says, that he ordered pursuit to be made from several ports, offering the pursuers one-half of the treasure if it could be recaptured.‡

The disappointment of Hernan Cortes, when he learned of this loss, may be imagined, but drawing a lesson from experience, he took measures also, in order to avoid such mishaps in the future.

The Spaniards complained bitterly of these depredations, committed by vessels countenanced and perhaps sent out by a friendly sovereign, but the neutrality obligations of those days were almost as lax as those of some modern maritime powers. The Greeks, Moors and Normans had been leading piratical nations, and the Norse taste for predatory expeditions developed the race of buccaneers, which inflicted so much loss and damage on the Spaniards in the seventeenth century. The jealous

* See note, *Martyr*, *Contarini;* see *Oviedo*, for an estimate of the value of the capture.

† See *Cortes de Toledo*, 1525, and *Herrera*, Dec. III, Lib. VII, Cap. IV.

‡ See note, *Contarini*.

colonial policy of Spain encouraged in other nations a desire to partake in the rich harvest, and in the end, impoverished her. Had the colonies been thrown open to foreign settlement and to a trade at least partially free, instead of being treated as they were, as part of the royal patrimony, a widely different result would have ensued.

Verrazano, who probably reaped a large share of the treasure and spoils derived from this capture, was again fitted out with a stronger fleet than before, and, according to Barcia, who is not always reliable in his accounts, made innumerable prizes in Spanish waters. He may have made another piratical trip in 1523, but if so, there is no particular mention of him in connection with it. Herrera says, that Pedro de Manrique was sent out, probably after the decree of 1523 had been issued, with a strong fleet of five vessels to convoy, from the Azores, five vessels from Puerto de la Angra, in the island of Terceira, known as the Armada de Averias,* and carrying an immense treasure of gold, pearls, sugar, etc. This was brought safely to Seville, and half the treasure was borrowed by the emperor to pay for the outfit of his army against Francis the First.† Perhaps Verrazano had watched the armament of Manrique, and finding it too strong to be attacked, resolved to make a second attempt at exploration, refitting in Madeira, and starting with the Dauphine alone early in 1524.

After his return from this last voyage, under date of July 8th, 1524, he writes to the French king, reporting what he had accomplished, and seems to have repaired to court‡ in August, the king being at Lyons. We incline, however, to the opinion that he made other and successful piratical expeditions to his previous field of

* One fitted out by the custom-house authorities.

† Herrera, Dec. III, Lib. IV, Cap. XXI.

‡ He was expected there, according to Fernando Carlis' letter, first published in 1853; see notes.

adventure. The story that he was taken and hung in this year has been told by two Spanish chroniclers, but it cannot easily be maintained in the face of recorded facts to the contrary, which we shall presently bring forward.

We learn by a letter of Peter Martyr, dated August 4, 1524,* that Florinus had captured, but a short time before this date, a richly laden Portuguese ship, bringing from the Indies a freight valued at 180,000 ducats. If this prize was taken at this date by Verrazano, he must have fitted out for the cruise in great haste, if we are to accept the date of his letter of July 8th from Dieppe as a true one. Martyr was, no doubt, using Florin's name in this case without proper authority.

The Council of the Indies, acting on the royal decree of 1523, fitted out some well-armed Biscayan vessels, which encountered and captured, in 1524, a piratical French fleet, and the pirates were taken to Seville to be tried. That pirates were taken is probable, but that Florinus was taken with them, as stated by Bernal Diaz and De Barcia, † seems unlikely. Viera does not speak of such a capture, but as he writes only of the Canaries, he may have omitted any reference to it, as not being within his subject-matter. Herrera, the most reliable authority, is also silent about the matter, which in an author otherwise so minute and careful, is significant. Peter Martyr, too, so very communicative on all such matters, says nothing about the capture and hanging of French pirates. The only authors who mention such a capture, and who name Florinus as the captain of the pirates, are the ones above mentioned.

The first of these, Bernal Diaz, says that the pirates were taken to Seville, and that Florinus, with other pirate captains, was forwarded to Madrid, but that the king sent an order to hang them on the spot, and Diaz adds that

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* See note, *Martyr.* † See notes, *Bernal Diaz and De Barcia.*

the hanging took place in the *Puerto del Pico.* This port is on one of the Azores of the same name, and opposite Fayal, where criminals had from a very old date been hung, and until quite recently was still the scene of such executions. Bernal Diaz did not, perhaps, know that Pico was a small mountain village on the road to Madrid, and naturally made the above mistake. He, however, was in Mexico at the time, and his authority, in regard to the identification of Florinus with the person hung as leader of the pirates, is not of great weight.

The only other authority for the same facts is Gonzales de Barcia, who, writing in 1723 in his *Ensayo de Florida*, under the year 1524, says that four Biscayan vessels took Florinus and carried him to Seville, with his companions. He adds that they were sent, or were about to be sent, to Madrid, but that to satisfy an influential and angry clamor he was hung in the Puerto del Pico, together with the other pirate captains. Barcia, who seems to have copied Bernal Diaz and made his confusion still worse, seems to have made another mistake, for it is improbable that the corsair chiefs, once in Seville, should have been sent to the Azores for execution.

The late Buckingham Smith assured us that he had been to the village of Pico, and that he had seen and copied the order for the execution. Unluckily, as he stated, the order, signed by the king, was given at Lerma, where the court then was, but bore no date. These documents of Mr. Smith, which are soon to be published, and to which, on that account, access has been denied us, would prove that some pirates were executed at Pico, while the king was at Lerma; but the name Florinus, even if it appears in the judge's order, would not prove that the career of the corsair ended here.

Notwithstanding such evidence, we hazard the conjecture that the indignant Spaniards did not get hold of the right man, but that either they assumed they had him (for it seems that the commander in question had never been

seen by the Spaniards), or that the chief so mentioned was a delegate or lieutenant, perhaps a relative, of our hero, commanding his vessels while he was on his exploring voyage or attending the king. This is not an improbable explanation of what appear to be contradictory statements, for we have very strong and positive testimony that our navigator was alive after the year 1524.

Upon comparing the accounts left us by these two authors, it is almost certain that the last copied the first in most of the particulars relating to Juan Florin; and if so, the reported death of the corsair at the hands of the Spaniards must be taken as founded on hearsay only.

We learn from Peter Martyr that the French corsairs were actively and successfully cruising for Spanish prizes in 1525,* but he does not again name Florinus as one of their commanders. A French document of 1526–7, to be spoken of presently, would seem to show that Verrazano was still disposed to pick up a prize, if possible, and perhaps he did so, but this is merely conjecture. Let us however proceed to that part of his career which more nearly concerns us, namely his voyage to the American coast in 1524.

VERRAZANO'S VOYAGE TO AMERICA.

We shall now speak of our navigator in his character of explorer, though he is only known as such by a letter addressed to Francis the First, just after his return from a voyage across the western sea. That other papers concerning this voyage were written, we know from the statement of Verrazano himself, and from Ramusius, but these papers are not now to be found. The letter to King Francis, dated at Dieppe, July 8th, 1524, proposes to give an outline only of his doings as an explorer. By a singular chance, this letter or a copy of it, found its way to Florence, the home of its author, and the diligent

* See notes, *Martyr*, Dec. VIII, Cap. IX.

Ramusio, or as he Latinized his name, Ramusius or Rhamnusius, secured it for the third volume of his collection of voyages and travels (published in 1556), and prefaced it with a eulogy of the navigator. Without omitting anything of importance, Ramusius, as it will be seen, has amended the style of the original letter.

Were it not for this narrative, thus saved from oblivion by the Italian geographer, the name of Verrazano would have been an enigma to after ages; for the meagre notices of him elsewhere found, would have afforded little to gratify curiosity. For three hundred years this letter was the only document attesting the fact of his voyage, and it seemed hopeless to expect that any chart, authenticating it, though such an one had been seen by the English geographer, Hakluyt, in 1582, should have been preserved to our times.

The letter of the Florentine, as it first appeared in 1556, unaccompanied by any confirmatory document, might well appear to be of doubtful authenticity. Such a letter might easily have been composed, either from oral or written information, by a clever writer familiar with the general results of the voyage of Estevan Gomez, in 1525, and it would of course be antedated, in order to establish a French claim to the hitherto unknown coast, from lat. 30° to 45° N, one thousand geographical miles in extent; from Florida to Bacalaos. No doubts of this kind, however, appear to have been raised, perhaps because Verrazano and his voyage were too well known at the time, to permit such doubts to be entertained. The exploration is confidently spoken of by Pierre Crignon, in 1539,* as having been made fifteen years before this date. Ramusius publishes Crignon's Memoir in 1556,† in the same volume which contains the Florentine's letter and no doubt was ever raised against the voyage until recently. A map similar to the one described below, seems to have

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* See notes, *Estancelin.* † See notes, *Ramusius.*

been generally known to geographers about 1530, for the great western sea, which is depicted on the map found in Rome, appears on charts after that date, and the name New France was given to our coasts, by all except Spanish geographers,* even before Cartier's voyage of 1534, and before the third volume of Ramusins was published.

Verrazano was probably familiar with all previous explorations of the New World, including the recent return of Magellan's last vessel, and had learned also that the only unexplored gap in the line of the new continent was comprised within certain limits, say from latitude 34° to 45° North. The avowed object of his voyage was, therefore, the discovery of a strait or passage within these parallels, to Cathay and the Spice Islands, shorter than the one discovered by Magellan in the far south.

Finding the New World as a great barrier to the approach of the rich East, and realising after the discovery in 1513 by Vasco Nuñez de Balboa of the South Sea, near Panama, and the long voyage across it by Magellan in 1521, that Asia was not connected with America, *within the tropics*, the Spaniards had almost abandoned the search for a nearer passage by sea to the Moluccas, Cipango and Cathay. Just at this time, Verrazano made his adventurous voyage, unsuccessful as to its primary object, but most interesting to Americans, as the first account of our coast by a European.

A close and critical analysis of this letter has not yet been made. The late Buckingham Smith doubted its authenticity, and sought to prove, from the letter itself, as also by contemporaneous evidence recently brought to light, that it was fictitious, and was probably composed by some Italian, anxious to heap laurels on the brows of his countrymen. Mr. Smith's "Inquiry" of 1864, is ingenious but not exhaustive.† Shortly after its appear-

* See Münster's Ptolemy of 1530, and other maps given by Kohl; Maine Hist. Soc., Pl. XIII–XV. Also notes, *Maps after Verrazano.*

† See notes, *B. Smith.*

ance, he learned that a map by Jerome Verrazano was preserved in Rome. In 1866, he published some remarks on M. Thomassy's account of it, still doubting whether it would serve to prove the genuineness of the letter. His idea of the original map seems to have been that it was on a very small scale, for he translates the modern label "*carta pecora*" (parchment map) as "*small map.*" He endeavored, but in vain, to procure a copy of it, though, had he been successful, his opinions would have been materially altered.

Dr. J. G. Kohl, the most able comparative geographer of our day, has also examined the letter,* and finds no reason to reject it. He examines the narrative closely, presenting his views concerning the exploration, which are entitled to great consideration, although he had also been unable to procure a copy of the chart now before us to compare with the letter.

If the letter of 1524 had been fictitious, and had been written with the intention of supporting a prior claim by the French monarch, it would have been heralded forth and great efforts would have been made to circulate it as widely as the despatches of Cortes, which appeared about that time. Documents giving the instructions or patent to the explorer would have accompanied this manifestation, and a map would have been given or spoken of as a proof of the actual exploration. It may be urged that the disasters which overtook France, and the capture of the king, prevented this publication, but these being past, no attempt was made to wrest from the Spaniards the claim acquired by the voyage of Gomez. The main object of the voyage, besides the discovery of a strait or passage to the Indies, was, no doubt, the further hope of finding another Mexico to conquer and plunder.

Disappointed at the poor results of the voyage, the French gave it no further thought, and similar indiffer-

* Op. cit., p. 248–70 and p. 290, note; also in notes.

ence attended the Spanish voyage of Gomez. These explorers brought home no gold, and reported but little that was inviting to Europeans. The notion that the precious metals were only to be sought for under the tropics was deeply rooted in the minds of men of that day, and the failure of the Cabots and Cortereals to discover rich countries in the north caused these early explorations to be neglected.

The learned and painstaking Italian editor, in his prefatory remarks to the letter, * expresses most distinctly his belief in the person and exploit of Verrazano, saying that he had received from many persons who knew him, the views entertained by the explorer respecting further voyages to be made to these coasts for settlement and discovery. Ramusius also had seen or heard of other letters, which he says were then lost, apparently stating it as a fact known to others besides himself. Pierre Crignon, writing in 1539, speaks of the voyage as having been made fifteen years before, without having, apparently, any knowledge of the letter to the king, first printed in 1556.

Hakluyt is another witness to the truth of the voyage, though of a much later date; but his statement is very explicit, and confirms the fact that Verrazano had prepared a map, which he had seen. In another memoir of Hakluyt, which is about to be published by the Maine Historical Society, this map is again spoken of.†

The existence of Verrazano, and of a map prepared by himself or by his direction, is thus put beyond doubt, and it will hardly be necessary to refute the arguments of the late Buckingham Smith in greater detail. ‡

Sir Humphrey Gilbert, who was a diligent collector of charts in support of his views respecting a north-west passage, makes, however, no mention of Verrazano's map

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* See notes, *Ramusius.*

† See notes, *Hakluyt.*

‡ See notes, *B. Smith.*

either in his discourse or map of 1566, although he speaks of the voyage as an accomplished fact.

This map, prepared, most probably, by Juan himself, (for his brother or relative Jerome is nowhere named by Hakluyt), was, no doubt, a duplicate of the one which he must have sent to the French monarch. It is nowhere stated that Juan was in England, and the story told by Hakluyt of his having made offers of discovering new lands to Henry the Eighth, has, so far, not a document to support it, though such an one may yet be found.

Who this Hieronimus di Verrazano, designer of the map now before us, could be, is uncertain. He is not mentioned anywhere, unless the allusion to Giovanni's brother, in Caro's letter, may have reference to him. Researches made in the proper quarter may explain his connection with the navigator. Possibly, he had accompanied his relative on the exploring voyage. He must have been an experienced cartographer, for his work is quite equal to anything of the kind at that date, and duplicates of it may yet be found.

We shall not attempt to criticise this newly revealed Mapamundi in detail. Any study of its general construction, and of its merits, would carry us too far away from the main point of interest to us, namely, its representation of our coasts as explored by Juan, in 1524, being the earliest authentic representation of them hitherto found.

The letter in question is given in the Collections of the New York Historical Society, Vol. I, New Series, 1841, with a translation of it, prepared by the late J. G. Cogswell. This translation was made from a manuscript copy which had been procured by Mr. G. W. Greene, in 1837, in Florence. Tiraboschi, in his History of Italian Literature, Vol. VII, page 261, had mentioned this text, and also a cosmographical treatise by Verrazano, as preserved in the Strozzi library in Florence. The Hon. George Bancroft drew attention to this notice in his History of the United States, Vol. I, page 20.

Mr. Greene, then U. S. Consul in Tuscany, found the MS. in the Magliabecchian library, which shared with the Laurentian, the old Strozzi collection, the former library receiving all the historical documents. The MS. is contained in a volume of miscellanies, marked class XIII, Cod. 89, *Verraz.* The letter and the appendix, Mr Greene says, are "written in the common running hand of the sixteenth century, tolerably distinct, but badly pointed," and the rest of the volume, containing miscellaneous pieces, chiefly relating to contemporary history, is evidently the work of the same hand.

The text, however, although the same in substance, was found in point of style to be quite different from that given by Ramusius, who appears to have "worked the whole piece over anew," correcting and improving the sailor's rough language. The manuscript was full of Latinisms and barbarous forms intermixed with pure Tuscan. The appendix, not given by Ramusius, "does not appear to be free from errors, some of which may be ascribed to the copyist."

It is not known whether the letter was first written in French or Italian. The subscription is a Latinized name, but it could hardly have been written in Latin. Nor is the original mentioned anywhere by any immediate cotemporary but the one to whom its preservation is due. This letter is followed, in the Strozzi volume, by the letter of a young Florentine, Fernando Carli, addressed from Lyons to his father in Florence, portions of which we give in the appendix.

Carli was in Lyons when the letter reached the King, and it seems to have been circulated and talked about. Carli, who appears to have had a taste for the sea, and who had before given accounts of the doings of a fleet fitted out to pursue Moorish pirates, saw the letter, and writes August 4th, 1524, to his father, about Verrazano's voyage, which he knew would interest the Florentines as compatriots of the explorer. He says that he has added

a copy of Verrazano's letter to his own, and Mr. Greene thinks that these were circulated and copied in Florence; the Strozzi manuscript being probably one of these copies.

Carli's letter, however, was not published until 1853, when it appeared in the *Archivo Storico Italiano*, etc., Tome IX, Firenze. Mr. Buckingham Smith had it translated for his paper, read before the New York Historical Society, October 4, 1864, in the printed copy of which both texts of it are given. Mr. Smith treats this letter as a fiction, simply because it does not allude to any other event besides this voyage, which fact we consider to be the best proof of its genuineness. In fact Carli says that he has written about other news before.

As a confirmation of Verrazano's letter, we give Mr. Smith's version of Carli's letter, slightly corrected, in the appendix. It will be noticed that a distinct allusion is made to the cosmographical portion of Verrazano's letter. The mention of a disastrous beginning of the voyage, is owing to his confounding the first attempt with the second one. Near the close, he gives a clue to the fate of one of the two vessels, which from Verrazano's letter, might be supposed to have been lost. Ramusius found them in Florence, and copied the Verrazano letter only, omitting the cosmographical appendix and Carli's letter.

Mr. Greene, in his article on Verrazano, which appeared in the October number of the *North American Review*, and in his Historical Studies, which we have freely used in this memoir, mentions the researches made by himself elsewhere in Florence, in order to glean some facts concerning Verrazano, but that none were found. An examination of the family library, left by the last of the race, then recently deceased, had been made by an Italian bibliographer, who stated that he had found nothing about Giovanni, except "a manuscript bound up in the family copy of Ramusius, and a few loose papers. These

last added nothing to what was already known. The former was purchased by Capt. Napier, R. N., and is now in England." Mr. Greene presumes that the MS. in in the bound volume, was the cosmographical appendix, or perhaps a copy of the same text as the one in the Magliabecchian library. He expresses a wish that Capt. Napier would publish it, if it should prove to contain anything not hitherto printed. As this has not been done, it is to be supposed that the surmise of Mr. Greene was correct.

Let us first take up the heading of the letter, which we translate, giving also the original texts of it, both from Ramusius, and as published by Mr. Greene, in a note to his paper above quoted.* The text as given in the New York Historical Society Collections, varies slightly from it. Paraphrasing it afterwards, according to our sense of its meaning, is, perhaps, the readiest way of criticising it.

"The Capt. Giovanni da Verrazano, Florentine from Normandy to the most serene crown of France, says:

"After the luck met with on the Northern coasts, most serene Lord, I did not write to your most serene and most Christian Majesty, about that which had been accomplished by the four ships, which it had ordered on the ocean to discover new lands, thinking that it would have been kept informed of all, how by the impetuous force of the winds we were constrained, with only the ships Normanda and Dalfina damaged, to run back to Brittany, where refitted, your sacred Majesty must have received the report of what we did with this fleet of war along the coasts of Spain, afterwards the new plan to pursue the first navigation with the Dalfina only, from which being returned, I will give an account to your sacred Majesty of what we have found."

Verrazano was not a ready penman and had neglected making any direct report to the King before this one, an

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* See note, *Heading of Letter.*

omission, or neglect which he seeks to excuse or palliate in the above awkward manner. We now offer a paraphrase of this heading, as explained by what we have gathered together in the earlier part of this paper.

We made a first attempt at discovery (no date given, but probably 1522) with four ships, but were driven back by storms. The two ships Normande and Dauphine, ran back to Brittany (probably to Brest) damaged, where we refitted. (He does not speak of the fate of the two others, but as Carli states that a certain Brunelleschi turned back at the first untoward obstacle they encountered, it is probable that both came back safely.) I did not write about the ill-success of this voyage, knowing that you had been otherwise informed about it. After refitting and gathering a fleet of armed vessels, we cruised in Spanish waters and made prizes, as you well know. (He refers no doubt to his capture in May, 1523, of one of the treasure-ships of Cortes.) I then determined to sail from the Desiertas direct, with the Dauphine alone, (this was in the spring of 1524), and have now just returned from this voyage, &c.

Verrazano, as we have seen, was generally in the Spanish waters from May to November in the three consecutive years 1521, 1522 and 1523. As we have shown in the first part of this paper, he captured a vessel with a large amount of gold early in the year 1521. In 1522 he cruised near the Canaries, according to Viera, and was driven thence toward the Azores, and brought home no prizes. Perhaps, after taking some months to refit, he sailed on his first exploring voyage late in one of these years, which would account for his ill-success and return in distress early in 1523. We know that in May or June, 1523, he captured the best of the three treasure-vessels sent out by Cortes in that year. He then may have sent his prize, with other vessels home, and sailed January 17th, 1524, on his voyage to our coasts, the account of which is contained in the letter. It is hardly possible, as

suggested by Dr. Kohl, that he could have made the first voyage in the autumn of 1523, and made another just after it, in 1524.

We now give translated extracts of the most important passages of the letter, omitting the long accounts of the natives and selecting those which bear directly on the exploration of the coast. In doing this we have found it necessary to make a new translation, which is more literal than the one given in 1841, and which we believe to be a more strictly accurate rendering of the original.

VERRAZANO'S EXPLORATION OF THE AMERICAN COAST.

1. From the Desiertas rocks, near the Island of Madeira of his serene Majesty the King of Portugal, with the said Dauphine, on the 17th of the last month of January, with fifty men, furnished with victuals, arms and other warlike instruments, and naval ammunition, for eight months, we started, sailing westward with an easterly wind, blowing with gentle and moderate lightness.

1. 1524 was Bissextile.

The true date was January 27th, new style.

The Desiertas are in latitude 32 deg. 30 min., long. 16 deg. 30 min., thirteen miles E. S. E. from Madeira.

Appears to have sailed for over three weeks with the north trade-winds.

2. In twenty-five [27?] days we ran 800 leagues, and on the 14th of February we encountered a tempest as severe as any one that sails ever experienced, from which, with divine aid and goodness, and to the praise of the glorious name (of the ship?), which, fortunately, was able to stand the violent billows of the sea, we were delivered, and resumed our navigation, continuing towards the west, inclining somewhat to the north, and in twenty-five [21?] days more we ran 400 leagues, when there appeared a new land never seen by ancient or modern.

2. He changed his course to W. N. W. in about long. 55 deg. W., and must have passed well north of the Bermudas,* which appear to have been unknown to him, although they were known to the Spaniards long before, for they appear on the map in Peter Martyr's works in 1511. He well knew the extent of the Spanish and French explorations, and is confirmed in his statement by Herrera, who says that no Spanish vessel had been along this coast before the voyage of Gomez, in 1525.

3. It showed itself somewhat low at first, but on approaching it, within a quarter of a league, we knew by the great fires which they were making on the coast that it was inhabited. We examined it, running to the south, seeking to find some port in it where we could anchor the ship to investigate its nature.

3. Drifted northwardly by the Gulf Stream, of which he seems also to have been ignorant, his course must have been almost N. W. after the storm, and he could not possibly, as he claims, have made land in latitude 34 deg., but must have struck it about 39 deg. 30 min., off Little Eggharbor beach.

He sighted land about March 6th, O. S. The fires were made by the Indians, who then flocked to the shore in the spring, to feast on shell-fish and manufacture shell money. His most southerly point after this was in 39 deg. 5 min., for if he had made his landfall in a lower latitude he would have seen and placed on his chart the great gulfs, known as Delaware and Chesapeake bays. Of these there is no trace on the map.

His most southerly point must have been, therefore, in 39 deg. 05 min., a few miles north of Cape May. He says nothing about the great inland or western sea depicted on his map, separated by a narrow isthmus from the Atlantic, and near which is the inscription given elsewhere.

He may have learned from the Indians that there was a great sea to the west (the Delaware), or his sailors may have sighted what they took to be such from the mastheads.

4. For the space of fifty leagues we could not find a suitable port of any kind where we could safely stay, and

* See note, *Examination of the Voyage.*

seeing that the land continued ascending (*scendęva*) towards the south, we determined to turn and examine it towards the north, where we found the same [difficulty] in landing on the coast. Ordering a boat to land, we saw a number of people, who came to the shore of the sea, and who fled as we approached, sometimes stopping and turning around, gazing with much admiration; but reassuring them with various signs, some of them came near, showing great pleasure on looking at the wonders of our dress and figure and white complexions, making divers signals (to show) where the boat could most easily land, and offering us their food. We could not learn many details concerning their customs on account of the short stay which we made on shore, and the distance (of the ship) from the shore.

We found, not far from these, other people whose mode of life we thought to be the same, and the shore was covered with fine sand fifteen feet high, extending in the shape of small hills some fifty paces broad.

4. The description of the coast applies very exactly to the shores of New Jersey. Hudson, in 1609, describes it in almost the same terms, and saw so many fires, even in September, that he called one of the inlets *Barnende gat*, now Barnegat.

His vivid and flattering description of the country and of its forests is exaggerated, in order to heighten the value of his discovery. But few trees in leaf could have been observed as early as March. The earliest flowering tree is the dogwood or *Cornus florida*, which opens about May 10th.

5. Then ascending we found some arms of the sea which entered through some inlets washing the shore on one and the other side, as the coasts run. (*Poi ascendendo si trovana alcuni bracci di mare che entrano per alcune foci rigando il lita dall una all altra parte come corre il lito de quello.* [This should, perhaps, read "channelling the beach from side to side as the coast runs."] When near by, the land shows itself broad, and so high that it rises above the sandy coast, with fine landscapes and a

country full of very great forests, partly open and partly dense, dressed in various colored trees of as great a size and agreeable appearance as it is possible to express.

5. This is the only description in the letter that we believe can be applied to the harbor of New York. He probably anchored outside of Sandy Hook or in the outer harbor, and saw Shrewsbury river, the Kills, and the Narrows, observed the bar and rapid tides, thus satisfying himself, without penetrating to the inner bay, that there was no strait here leading to the South sea. The expression "washing the shores on both sides as the coasts run" would apply to several parts of these coasts, but taken in connection with the "*several arms of the sea,*" it applies especially to the two long sandy spits known as Sandy Hook and Coney Island, which form the entrance of New York harbor.

His mention of land rising inland makes it almost certain that he was in New York harbor. No such feature is seen south of it. He would have in view from his anchorage, Long Island, rising to about 100 feet, Staten Island to 307, and the Navesink Highlands 232 feet, these last being close to the shore.

6. It [the land] has many lakes and ponds of living water, with numerous kinds of birds adapted to all the pleasures of the chase. This land is in 34°, the air wholesome, pure, and tempered as to cold and heat. The winds do not blow fiercely in these regions, and those which prevail most are north-west and west.

During the summer season in which we were there, the sky is clear, with little rain; and when sometimes the southern winds bring in suddenly some fog or mists, they do not last, and are dispersed, it becoming pure and clear. The sea is gentle and not boisterous, its waves being gentle. Although all the coast is low and devoid of ports, it is not dangerous to navigators, being all clear and without any rock. The depth, as near as four or five paces from the shore, at high or low water, is twenty feet, increasing with such uniform proportion to the depths of the sea, with such good holding ground, that any ship, however tossed by a tempest in those parts, cannot perish.

provided the cable does not break, and this we have proved by experience. This we positively tested, for in the beginning of March, the winds blowing with great force, as in other regions, we were riding with the ship on the open sea, and found that the anchor must break before it would drag or make any movement.

6. This paragraph in the letter, including a part not here given, forms a *resumé* of all that he had observed up to this time, with general remarks that apply to the whole of our coast.

Notices the prevalent north-west winds, a peculiar feature in our climate. Also the absence of fogs, the absence of all outlying rocks, and the good anchorage along the coast, with the shelving bottom. He exaggerates, however, the boldness of the coast, as forty or fifty paces would be the nearest distance for such a depth as he notes. This may be due to an error of the copyist. He could hardly have invented the combination of all these features, so different from any part of the European shores.

Comparing the narrative with the chart, it will be seen that there is an indentation of the coast which is, no doubt, meant to indicate New York harbor, for the trend of the coast here changes, as represented on the map and described in the letter.

7. We started from this place, continuing to run along the coast, which we found turning to the west [east], observing along the whole of it great fires from the number of its inhabitants. Approaching the shore to get water, there being no port, we ordered the boat on shore with twenty-five men [a large boat?]. On account of the very heavy surf beating on the shore, which was quite exposed, it was not possible, without peril of losing the boat, for any one to put foot on shore. We saw many people coming to the shore making various friendly signs, pointing out where we might land.

7. Leaving New York harbor, he finds the coast running west (evidently a mistake for east), and runs down the south shore of Long Island. There are but three or four practicable inlets along this coast, and they are not readily discovered when a few miles at sea.

Long Island, and particularly Rockaway bay, was a great resort for the purpose of manufacturing *wampum* or *seawan*, the money currency of the natives. Numerous shell beds line the shores of the bay where the manufacture was carried on. The incident related here probably happened on Rockaway beach, where the land meets the narrow and barren outer sand-bar, which for over seventy miles separates the ocean from the bay or lagoons behind it. It must have happened at some point where there is no outer beach.

8. Leaving here, and always following the shore, which turned towards the north (meaning somewhat to the north), we came, in the space of fifty leagues, to another land which seemed very beautiful, and full of the largest forests. Landing on it, twenty men went about two leagues into the land, and found that the people, from fear, had fled into the woods. We saw many of their boats, made from a single log twenty feet long and four feet wide, which are manufactured without [the help of] iron or stone, or any kind of metal, for in the space of the whole 200 leagues which we had coasted of this land, no stone of any kind was seen by us. By the aid of the fourth element they take out enough wood to serve for the hollow of the boat, and do the same for the bow and stern, so that in navigating it may cut the water.

The land, as to site, richness and beauty is like the other, full of forests of various kinds of woods, but not so odoriferous, from being more northerly and colder.

8. The south coast of Long Island has a general trend to the E. N. E., and there is but one conspicuous inlet (Fire Island inlet) along its whole extent of 115 geographical miles. The first third of the island lies nearly east and west, the rest turning to about E. N. E. by N. Thus his course, first east and then north, may be understood as applying to Long Island. By the expression "stretched to the north," he means that the land was to the north of him. He appears to have landed again near Quogue or Bridgehampton. His remark that this is *another land*, distinguishes Long Island from New Jersey distinctly.

9. After remaining in this land three days, riding on the coast, from the paucity of harbors, we resolved to depart, running always along the coast, between north and east, and only sailing [by day] and dropping anchor at night.

9. The navigator certainly repeats himself here, that is, writing carelessly or hurriedly, and having made digressions, he means that after leaving either New York harbor or the Rockaway shore he sailed rather more to the N. E.

10. At the end of a hundred leagues, we found a very pleasant site placed among some small rising hills, in the midst of which there ran towards the sea a very large river, which was deep at its mouth, and from the sea to the hills there, on the flood tide, which we found eight feet [rise], there might have passed ships of any burthen. Being, however, anchored on the coast in a good berth, we did not wish to venture in without a knowlege of the entrance. We proceeded with a boat to enter the river and land, which we found very populous, and the people much like the others, dressed with birds' feathers of divers colors. They came towards us joyfully, emitting very great shouts of admiration, showing us where, with the boat, it was safest to land. We ascended the said river into the land about half a league, where we saw a fine lake about three leagues in circuit, through which there were passing from shore to shore about thirty of their boats, with numbers of people who were crossing over to see us. In a moment, as often happens in navigating, a violent contrary wind from the sea blowing up, we were forced to return to the ship, leaving the said land with much regret, considering that from its convenience and pleasant aspect it could not but have some valuable quality, as all the hills there showed minerals.

10. Passing around Montauk point, the easterly extremity of Long Island, he would find a great contrast awaiting him, for whereas he had hitherto sailed along a sandy coast without rocks,

and, excepting New York, with only low hills in the distance, he now would find in front of him the rocky coast of Connecticut, and the outlying rocky islets known as Gull or Fisher's islands, while in the distance, on the right, he saw Block island, the only really detached island along our coast, from the Bahamas, near Florida, in latitude 26 deg. 30 min., to this island, in lat. 41. deg. 10 min. Some have considered that either Nantucket or Martha's Vineyard were here described, but there can be no doubt that these islands were not noticed by him as insular.

The "pleasant situation among steep hills, etc.," is probably the mouth of the Thames, which he reached, passing through the race between Fisher's and Gull islands. The tidal current through the race was observed by him and is alluded to here. The vessel was anchored in the roadstead behind Fisher's island, fearing to enter, and a strong southerly gale might well have induced his boat to return to the ship.

The distinct indication on the map of a large inlet, resembling Long Island sound, was put down while here. He may have explored it sufficiently to be satisfied that it was not a strait such as he was searching to discover.

11. Weighing anchor, we sailed eastward, as the land turned that way, running eighty leagues. [Ramusius says fifty.] We saw, always in sight of it* (*sempre a vista di quella discoprimmo*), an island of triangular form, distant ten leagues from the continent, in size like to the island of Rhodes, full of hills, covered with trees and thickly inhabited, [judging] from the series of fires which we saw them making all along the shore. We baptized it with the name of your illustrious mother [Louisa].

11. The fifty or eighty leagues is an overestimate, and the island he saw, and which was certainly Block island, must have been noticed before. It has no harbor, and the shores are gravel and sand cliffs, the interior being hilly, and at that time covered with trees, which may have made it appear higher.

* The punctuation may alter the sense here so as to read, "*running eighty leagues, always in sight of it,*" *i. e.*, the land; the island being discovered afterwards.

12. Not coming to anchor there on account of the contrary weather, we came to another land, distant fifteen leagues from the island. We found a very fine port, into the mouth of which we entered. We saw about twenty boats with people, who came with various cries and wonder around the ship, not approaching nearer than fifty paces, stopping to consider our build, our looks, and dress. Then they altogether sent up a loud shout, signifying pleasure. Reassuring them somewhat, and imitating their gestures, they came so near that we threw to them some bells and mirrors and many trinkets, which they took laughing, and carefully looking around the ship. * * * We struck up a great friendship with them, and the day after, we entered the port with the ship, we having been anchored a league out at sea on account of a contrary wind. * * * They came with a number of their boats to the ship, their faces painted and daubed with various colors, showing real signs of pleasure, bringing us some of their provisions, making signs where we should anchor in the port for the safety of the ship, keeping with us until we had dropped anchor, in which we stayed fifteen days, refreshing ourselves in many ways. * * * They would rest on an island a quarter of a league from us. * * * We, several times, went inland five or six leagues, finding it as pleasant as is possible to be described; all kinds of cultivation going on, corn, wine, and oil. There are spaces of twenty-five or thirty leagues of bare, open country, and devoid of any impediment of trees, of such fertility that any kind of seed in it would yield its utmost.

12. He entered Narragansett bay only fourteen miles from Block island, and at first he seems to have anchored at its mouth, but afterwards between Goat island and the present town of Newport. Throughout the letter we have refrained from criticising the notices of the natives, confining our remarks to geographical points only, but it would be impossible to describe the

inhabitants of these shores with such accidental precision, were the letter a mere fiction.

Dr. Miller, in the New York Hist. Coll., Vol. I, applied this description of Narragansett bay to the harbor of New York. Dr. Cogswell, in the New Series, Vol. I, of the same, corrected him, but we think erred in making the description of the Thames adapt itself to New York.

Our opinion, however, of the letter, in a geographical point of view, is that the navigator penned it in haste, and was more anxious to please the king, by a favorable report of the coasts explored, than to describe them correctly. The letter must not be strictly accepted as detailing all the courses sailed, and as describing all the harbors visited.

As he was here in April, he could not have found ripe fruit on the trees, but the Indians, as we know, laid in stores of dried fruit and nuts for the winter. The boats made from single logs, called *dug-outs*, are still made and used by the white people. The Indians used fire to hollow out their boats, applying the fire to a tree left standing, from which the bark had been removed a year beforehand. The fire could be easier managed on the upright log, so as to control the process, and make a neat finish. The broad-bladed paddle used by the two arms, without a rest, describes the Indian mode of rowing exactly.

The round Indian lodges, thatched with marsh flags, were not peculiar to these tribes. The pulse was the maize or Indian corn, of which they had several varieties, and as stated, the planting and the harvesting were preceded by various ceremonial observances.

The most remarkable omission in the description of the natives is that of the habit of smoking tobacco, which prevailed among them as far north as Maine.

13. This land is situated on the parallel of Rome, in 41¾°, but somewhat colder by accident and not by nature, as I will relate to your Majesty elsewhere. Describing now the site of the said place [*posto*, query *porto*,] it looks towards the south, half a league wide, then entering, it extends to the east and north twelve leagues, where, widening, it forms a most ample basin, with a circuit of

twenty leagues, in which are five islets of much fertility, and pleasant, full of high and spreading trees, among which islands any number of fleets might remain without fear of storms or of any other chance obstacles. Turning towards the south, at the entrance of the port, there are, on both sides, gentle hills, with many channels that pour clear water from the hills into the sea. In the midst of the mouth [of the harbor], there is a reef (scolio) of free stone, of a kind fitted to build any kind of machine or fort for its production.

13. The latitude given here is nearly correct, the entrance of this bay being in latitude 41 deg. 27 min., which coupled with the notice that the harbor looks south, leaves hardly a doubt as to the identification of this position.

He was able, here, to observe the latitude at leisure, and repeatedly. With the instruments then used, the altitudes taken at sea were not trustworthy, being liable to an error of several degrees; but with a large wooden quadrant of some four feet radius, fitted with a plumb line, and on which the degrees were an inch long, it would be possible to read altitudes to within ten minutes. The rock is evidently meant for Goat island, which is admirably adapted to defend Newport harbor. This, it will be observed, was the only sheltered port into which he took his ship during the cruise. He was here from May first to sixteenth, new style.

14. Having refreshed ourselves at our leisure, we left the said port on the sixth day of May, following the shore, never losing sight of the land. We sailed 150 leagues, finding it of the same nature, and a little higher, with some mountains, which all showed minerals. We did not stop there for fear that the favorable weather might not last (*per la prosperita del tempo ne serviva*). Looking at the coast, we thought it was like the last.

14. Leaving Newport, his course was first east-south-east, and then northerly. The one hundred and fifty leagues include the fifty mentioned just after; in fact, the last paragraph is a general sketch of the land north of Cape Cod, which he was about to explore.

15. The shore ran to the east; in the space of fifty leagues, holding more to the north, we found a highland full of dense woods, the trees in which were pines, cypresses, and such like, which grow in cold regions. The people [were] quite different from the others, and in proportion as those before were gentle in behaviour, these were in roughness and appearance the more barbarous; so that no matter how many signals we made to them, we could hold no conversation with them. They were dressed in the skins of bears, wolves, marine lynx (*cervieri marini*, seals?), and other animals.

15. He passed around south of Martha's Vineyard and Nantucket, considering them as the main land, and must have been made cautious of danger by the tide rips and soundings on Nantucket shoals. These he indicates on the map as a long sand spit, which seems to be named *Cap Arenosus* on the map; and steering well clear of Cape Cod, he probably made Cape Ann and the rocky coast of Maine. The change of scenery and of the people are noted.

16. Twenty-five men went inland, against their [the natives] will, two or three leagues, and when they returned to the shore they shot at us with their bows, shouting loudly, and escaping into the woods. We found nothing of any value in the land, except immense forests, with some hills. They may have some metals, as we saw many of them with copper (*rame*) rings in their ears.

16. It is uncertain where this landing was made, but it was probably between Nahant and Cape Ann.

17. We departed, running along the coast between east and north, which we found more pleasant, open and bare of woods, with high mountains back in the land, sloping towards the shore of the sea. In [the space of] fifty leagues, we discovered thirty-two islands, all near to the continent, small, and of good appearance, following the outline of the land (*alte tenendo la verzura della terra*), from which were formed the most beautiful ports and

canals, as they do near Illyria and Dalmatia, in the Adriatic sea. We had no intercourse with the people, but supposed them to be, in their customs and nature, like to those we had left.

17. The distant mountains may well have been the White Mountains in New Hampshire, which, on clear days, are visible from the sea, and would at this season still be covered with snow. His remark that there are no mountains near the coast is a correct one.

The rocky islets of the coast of Maine, which he so well compares to those on the Illyrian coast, prove that he had really been here, for no map of the time could have suggested this feature.

18. Sailing between east and north for the space of 150 leagues, and having already consumed all our naval stores and victuals; having discovered 502 leagues, that is 700 more of new land, supplying ourselves with water and wood, we determined to return to France.

18. In the appendix, he gives his departure from the coast as in latitude 50 deg., which would imply that he visited the east coast of Newfoundland. This we doubt, as he merely wished to connect his own coastwise explorations with the well-known Terra de Bretones and Terra Nova, and would hardly extend his voyage to points frequented by the Portuguese and Spaniards.

His map shows no trace of the Bay of Fundy, and he does not describe any point, towards the close of his coasting, that can be identified. It is probable that he turned away in about latitude 44 deg., being confident, from the easterly trend of the coast, that he had traced the continental barrier to a point already visited. The map shows a large river estuary, which is, perhaps, the Penobscot, whence he started homewards. He may have sighted Cape Sable, but probably missed it by having taken an E. S. E. course from the point of his departure. His estimate of 500 leagues of new discovery is nearly correct, if we assume that he struck the coast in latitude 39 deg. 30 min., and left it in latitude 44 deg.

His own estimate of the length of a degree is 62½ Italian miles, and he coasted, from our estimate below, some 540 geographical miles. His expression "500, that is 700 leagues," is explained in

the appendix, where he says that he made 300 leagues in latitude (about five degrees), and 400 in longitude.

He could, as we believe, not have coasted an extent of more than five degrees of latitude, and about six degrees of longitude. The dates appear to be as follows, old style:

January 17th, leaves the Desiertas.

March 6th, reaches land.

March 15th, probably reaches New York harbor.

April 21st to May 6th, in Newport harbor.

May 6th to 20th, probably coasting.

July 8th, arrives at Dieppe; twenty-eight days voyage.

Upon an attentive examination of the courses and distances sailed, some of which are given twice, we come to about the same result as his own.

1. From landfall, coasts south	50	leagues.
2. Coasts north to New York, say	100	"
3. Thence east and north to Thames R	100	"
4. To Newport (overestimate?)	80	"
5. Newport to Cape Ann	150	"
6. North-east	150	"
	580	

§. The navigator must have meant to use the term miles of 62½ to a degree, for he would otherwise quadruple the true distances.

In the case of the third course and of part of the fifth, he certainly repeats himself. His estimates must be mere guesses in round numbers.

A measurement from a U. S. Coast Survey chart of the coast, dated 1864, gives the following result:

Latitude 39 deg. 05 min. to New York	90	miles.
New York to Montauk point	110	"
Thence to Thames and Newport	60	"
Newport to Cape Ann	170	"
Cape Ann to Penobscot river	110	"
	540	miles.

Old navigators were very prone to exaggerate the distances sailed. See instances quoted by Humboldt, *Examen Critique*, V. 161, who says that the direction is more important than the distance.

LETTER AND MAP COMPARED.

With the aid of the map newly discovered, we can follow Verrazano's track along our shores with some confidence.

First, the Jersey coast is shown trending too much to the N. E., but the variation of the compass to the westward would cause it to appear so to him. Then the harbor of New York shown as a river only, because he probably did not penetrate far into it. Next the Long Island coast, correctly shown, inclining more to the eastward, with the interesting and correctly-indicated feature of a sound behind it. He passes Fisher's island, which he seems to have supposed to be connected with Point Judith, of the mainland, just east of it, which appear on his map as a promontory, beyond which he places Narragansett bay, with his *I. Luisa*, or Block island, off its mouth.

The E .S. E. trend of the coast from that point on his map is due, as observed before, to his having taken Martha's Vineyard and Nantucket as part of the mainland. The long sand-bar to the east of this is a rough draught of Nantucket shoals, or Cape Cod, as they presented themselves to him.

It will be noticed that the parallels of latitude on the map are very different from the observations recorded in the letter. These parallels are all full five degrees too much to the south of their proper position. Hieronimus, who made the map, must have committed this mistake, and we can offer no explanation to account for the discrepancy. On the charts of those times, we do not expect that the longitude can be more than guessed at, but the latitude is generally within much narrower limits of error.

Columbus, also, was very wrong in his data for the latitude of the island of Cuba, and does not seem to have ever corrected himself. Perhaps the latitudes on *this* map were made expressly incorrect in order to mislead the uninitiated, or in order to avoid appearing to encroach on the Spanish discoveries, which, under Matienzo and Ayllon, had been carried, in 1520, to lat. 34°. Giovanni was, no doubt, aware of the fact that the Spaniards had reached this altitude before his voyage hither, and Hieronimus in 1529 had, perhaps heard that lat. 37° had been reached by Ayllon in 1526.

Perhaps the indication of a western sea, separated by an isthmus from the Atlantic ocean, appearing on maps after 1529 as *Mar de Verrazano*, was an attempt to place the great *Baia de Santa Maria* (Chesapeake bay) on his chart, thus giving to Nova Gallia the appearance of a land distinct from the Florida of the Spaniards. This would account for the absence of all mention of it in Giovanni's letter of 1524.

For some remarks on the cosmographical portion of the letter, we must refer to the notes at the end of this paper.

His Occupations after the Voyage to America.

After the dispatch of the letter to the king, we learn from Carli that Verrazano was expected at Lyons, where he may have gone to report in person to the king, but there is no mention of his appearance there. Afterwards we almost lose sight of the adventurous explorer, who offered to the French monarch a vast province in a temperate latitude, on which France might well have concentrated her enterprise, and which would have repaid her a hundred-fold as a colony, and as a school for her maritime forces. But at that time, France was nearer annihilation than during her recent struggle with Germany, and all thought of colonization beyond the seas was out of the question. The king was a prisoner in the hands of the emperor, his army had been dispersed, his treasury

emptied, and the prospect was such that without help from abroad France would have become a province of the empire. England, at this juncture, lent her assistance to her distracted neighbor in her traditional form, a loan of money. As Mr. Biddle well suggests,* Verrazano, finding no response to his offers to make further explorations, may have laid before Henry the Eighth his newly made discovery, for we find Hakluyt, in 1582,† saying that "John Verazanus, which had been thrise on that coast, in an old excellent mappe which he gave to King Henrie the eight, and is yet in the custodie of master Locke, doth so lay it out as it is to bee seene in the mappe annexed to the end of this boke, beeing made according to Verazanus plat." Hakluyt is advocating a renewed search for a north-west passage to China, and colonization of the coasts visited by Verrazano. His statement that he had been thrice on that coast is probably taken from Sir Humphrey Gilbert's little treatise of 1566, ‡ published in 1576, who only says, Cap. X, "Also divers have offered the like unto the Frenche king, who hath sent two or three times to have discovered the same," meaning the north-west passage. Gilbert was, no doubt, familiar with the work of Ramusius, and names Verarsannus, a Florentine, several times, though in one case (Cap. III, § 7), the name of Cartier is intended. In a paragraph just before this, he states that "Jacobus Cartier made two voyages into those partes." He does not seem to have been acquainted with Roberval's voyage, so that he evidently meant to include Cartier's voyages of 1534 and 1536 in his expression above quoted.

Hakluyt has left another notice of the "*excellent Mappe*," contained in an unpublished manuscript belonging to Sir Thomas Phillips, and which this gentleman has kindly allowed to be copied for the Maine Historical

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* Biddle's *Cabot*, 1831, p. 276. † *Divers Voyages*, Epist. dedic.

‡ *A discourse of a Discoverie for a new passage to Cataia;* London, 1576, 4th. This rare tract is given in Hakluyt.

Society. This manuscript will be published at an early date, with notes; but, meanwhile, in the first volume that was prepared for this society by Dr. Kohl, we find an extract from it, added to a foot-note at page 291, by the late Gov. Willis, who edited the volume. This manuscript, prepared in 1584 for Sir Walter Raleigh, and covering over sixty-two large folio pages, makes, in Chap. 17, §§ 10, 11, an interesting reference to "*a mightie large olde mappe in parchmente, made, as it should seme, by Verrazanus, now in the custodie of Mr. Michael Locke,*" and also to "*an olde excellent globe in the Queene's privie gallery at Westm'r, w'ch also seemeth to be of Verrazanus makinge.*"

It will be observed that in neither of these passages from Hakluyt is the map positively said to have been made by John Verrazanus, but that it was derived from him, and that it seemed to be of his make. This careful absence of an assertion that it was by John, was, no doubt, owing to the name "*Hieronimus de Verrazano faciebat,*" appearing on it. Hakluyt could not probably explain this difference of name, and therefore makes a carefully-guarded statement concerning it.

He describes, however, the map now preserved in Rome in these few words so exactly that we are led to suppose that it was the very one that was presented to the English king about 1529, and still to be seen in the queen's gallery in 1584. Sebastian Cabot's great mapamundi of 1544 was also in this gallery, and we should be rejoiced to find in some old document a list merely of the maps that hung there.

That Verrazano may have made a proposal for discovery to the English king is possible, but there is not a scrap of evidence to prove it, excepting Hakluyt's assertion above quoted. If he made such an offer, it was not for the sake of emolument, for he seems to have been provided with ample funds, as we have just shown, and as might be expected after the rich captures he had made.

In 1526, or perhaps later, his name is included as the commander or pilot of a squadron of three vessels fitting out, apparently for a mercantile venture, but in reality for another cruise in Spanish waters. We find proof of this in a document discovered and quoted by the indefatigable Mons. Margry, in his *Navigations Françaises, etc.*, Paris, 1867, p. 194, and given in a partly abridged and translated form in the notes to this paper.

This document is an agreement for a voyage to the Indies for spices, including prospective predatory captures, which last were, no doubt, the chief incentives to the enterprise. Nothing is said about discovery, or the search for a western route to the Moluccas.

The agreement is made between Philipe Chabot, admiral of France, Preudhomme, the general of Normandy, several merchants, among whom is the notable and famous Jean Ango, and "messire Jehan de Varesam, principalle pilote."

This was indeed a partnership of distinguished men; two royal officers of high rank, three rich merchants, and a pilot who is able to venture a sum equal to that of Jean Ango, the great merchant-prince of Dieppe. There can be but little doubt that this pilot was our successful corsair, who must have reaped a fair share of the prize taken from the Spaniards. The paper, unluckily, is not dated, but, as Mons. Margry remarks, it must be posterior to 1525, as Chabot was not appointed admiral of France until 1526.*

The enterprise was hardly meant to be a purely commercial one, when the character of three of the partners is taken into account. Commanded and guided by a successful corsair, who five years before, had captured most valuable prizes from the Spaniards and Portuguese, and who, three years before, had taken the spoils of

* His appointment, according to Père Anselme, Vol. IV, p. 571, dates from the 23d of March, 1525. As the legal year began March 25th, he was really appointed in 1526.

Mexico when just about to be laid at the emperor's feet, it is not likely that he should be contented with a distant and uncertain trip to the Spice islands.* This new venture was, no doubt, to be another corsairial one, and the paragraph of the agreement which alludes to possible prizes to be taken, and which we give in full, explains the *animus* of the undertaking.

Giovanni de Verrazano was therefore alive and prosperous in 1526. That the French were able to fit out vessels in spite of the national distress, we have sufficient proof. But a slight impression could have been made on the towns of the Atlantic coast by the war with the emperor in Italy. The armies were small, the French Mediterranean fleets were fitted out on the southern coasts, and only the people along the line of march of the armies could have suffered much.

Whether this voyage was undertaken, and if so, what happened during the course of it, is unknown. If the vessels reached the East Indies, they would have been absent two years. Perhaps a careful study of the planisphere of 1529, as recording what was then known about the south-eastern regions of Asia, might throw some light on the question whether Verrazano was there in person. A cursory study of it will show that it contains some discoveries of the Portuguese, then recently made; but these may have been copied from charts taken from prizes, and do not prove anything.

If the execution of our navigator took place in 1527,† and the late Buckingham Smith stated to the president of our society that he had proofs to that effect, which are shortly to be published, it is possible that Verrazano was captured while on this cruise. His previous success may

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* See notes, *Admiral Chabot;* also *Buckingham Smith.*

† See Transactions of this Society for 1871, p. 82. Also the Rev. B. F. De Costa's "Northmen in Maine," etc., 1870, p. 61, note, who states, on Mr. Smith's information, that the execution took place at El Pico, in New Castile, in October, 1527.

have led to the fitting out of the armament above described, the mention of the East Indies in the agreement having been inserted in order to conceal the real objects of the enterprise.

The uncertainty that hangs over his death, both as to its manner and date, may be cleared up, but at present his name disappears from history after the proposed voyage to the East Indies.

Ramusius, in the preface to the letter of 1524, states simply that on the last voyage which he made, naming no time or locality, he was taken by "*those people*" when landing with some companions, and was roasted and eaten in the presence of those who had remained on the ship. Having just spoken of his voyage to Florida, Ramusius, no doubt, meant by "*those people*," American savages, who however, never killed and eat captives unless they were prisoners of war. Supposing, however, that the story came to his ears in that form, whence or from whom did he derive it?

Ramusius was in correspondence with Oviedo, the Spanish historian of the Indies, and may have learned the story from him, as we shall presently show, though Oviedo could hardly have told it as having happened to Verrazano. Ramusius himself, as we suppose, inserted the Italian navigator's name as the victim of the butchery.

In order to understand clearly what we are to believe, it will be well to say that no exploring voyage to the American coast, between Terra Nova and Florida, is known to have been made between the years 1524 and 1534, excepting the Spanish ones of Estevan Gomez, in 1525, and of Ayllon, in 1526, and one by John Rut, or Root, sent out in 1527 by Henry the Eighth. The French, most certainly, did not undertake one, and the above are the only ones of which there is any record.

The voyage of Gomez, who explored the coast from Bacalaos to Cuba, was planned in 1523, but was delayed until 1525 by his having to attend the Council of Bajadoz,

and it was then possibly hastened by the report that the French had undertaken a similar one. Ayllon's voyage was made northwards from the West Indies, and is fully described by Oviedo; but he certainly did not get further north than Cape Fear, in north lat. 34°.

The English voyage to which we have alluded was made in 1527, but very little is known about it. It appears to have been an attempt to accomplish the discovery of a north-west passage by some strait north of Newfoundland, and like all others before and since, it failed in its object. It is not certain at whose instance it was undertaken, Hakluyt giving Robert Thorne, an English merchant trading in Seville, as its projector,* while Biddle hints at the possibility of its having originated with Verrazano. † If he sailed for the East Indies about this time, he could not have been in England to propose such an expedition. We find, however, that a certain learned Italian, Albert de Prato, was with the expedition, and it is possible that he was the active agent who induced the English monarch to send it forth. De Prato was a Florentine, perhaps a friend or agent of Verrazano's, who may have supplied him with the arguments to lay before the king in favor of the enterprise. Jerome, the author of the map before us, may have accompanied him to England to forward the views of his relative, but all this is mere conjecture.

Hakluyt, in 1582, and in his later works, speaks of an expedition of 1527, about which he could ascertain but very little. ‡

Samuel Purchas, in Vol. III of his "*Pilgrimes*," 1625, p. 809, has a letter, written from Newfoundland, August 3d, 1527, and some authentic details concerning this voyage, made nearly a century before. We learn that its commander was John Rut; that two vessels, the Mary of Guilford and the Samson, were under his command, and

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* See note, *Voyage of* 1527. † Biddle, *Cabot*, p. 276.

‡ See note, *Voyage of* 1527, and *Hakluyt*, on same.

that they sailed from Plymouth June 10th, and attempted to pass to the north of Newfoundland. The Samson parted company in a storm, and was not heard of again, while the Mary, two days afterwards, on the third of July, met with ice, and, giving up the main purpose of the voyage, put into St. Johns, Newfoundland. Here Rut addressed a letter, dated August 3d, to the king, accompanied by one from Albert de Prato to Cardinal Wolsey. Purchas, unluckily, does not give this last one, and the originals of both have disappeared. Rut declares his purpose to reach certain islands, to which he has been ordered, whether the Moluccas or West Indies is uncertain. Purchas says nothing about the return of Rut, but Hakluyt, in his work of 1589, informs us that he had heard that he reached home in October.

This is all that is positively known about this voyage, from English sources, but we find in two Spanish authors a notice of the visit of an English corsair to the West Indies in this year, whose commander gave such an account of his adventures that, as first suggested by Mr. Biddle in 1831, we must believe the vessel to have been the Mary of Guilford.*

The story was told by the English commander to a certain Ginez Navarro, captain of a caravel in the harbor of San Juan (Portorico), in November, 1527, and it agrees well with the details recounted in the letter of August 3d, but has the additional mention of the death of his pilot. This, he said, had happened between Newfoundland and Rio Chicora † (Savannah R). The pilot, a Piedmontese, had landed to speak to the Indians, who had killed him. His name is not given, nor is it said that he was roasted and eaten, together with those who landed with him.

Mr. Biddle,‡ with much ingenuity, placing the above

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* See note, *Oviedo and Herrera on the English vessel of* 1527.

† This name was given by Ayllon in 1520.

‡ Biddle, *Cabot*, Chaps. IX, XIV.

facts together, concludes that the Piedmontese pilot was Verrazano, thus confirming the account by Ramusius, and giving its true date. It will be noticed that the name of Verrazano is nowhere associated with this voyage, and that Mr. Biddle's conjecture is founded on the fact related to Navarro that the pilot was a Piedmontese, and that his fate was somewhat similar to the one recounted by Ramusius as having happened to our navigator.

From this theory, plausible as it may appear, we must dissent, for the following reasons: Verrazano was a person of too much consequence, supposing him to have been the pilot of the expedition, to have remained without mention in Rut's letter. Neither was his name recorded in De Prato's letter, else Purchas would have quoted it, for it was familiar to the author of the "*Pilgrimes*," and he would have eagerly published the fact.

Again, had Verrazano been with Capt. John Rut, it is not probable that he would consent to repeat his exploration of our coast while the north-west passage remained to be attempted. This would have converted an enterprise which had a noble object into a mere trading voyage, while we know that Verrazano's favorite idea was the discovery of a short sea-way to the Moluccas. He had, to be sure, proposed colonization to the French king, but Rut seems to have had no such instructions. As Navarro relates, he wished to reach the territory of the Grand Khan, but was easily turned aside from his purpose, and sought a market for his wares in the West Indies.

Verrazano, further, was the very last person to have consented to a West India voyage only, for his name was in every Spaniard's mouth as having captured several of their treasure-ships, and he would not have deliberately put his head into the lion's mouth.

If Rut did lose his pilot in the manner told by Rut, it may well have been Albert de Prato who was killed. We know nothing about this Florentine, but he appears to have been the companion and associate of Rut, no doubt

his pilot, as sailing masters were then called, and he was probably in possession of a chart of the exploration of 1524. Ignorant of the savage nature of the tribes inhabiting the coasts of Maine, who appear to have been made more hostile by the French fishing vessels, who from an early day frequented those coasts, he may have been massacred on attempting to land among them. Verrazano knew their nature better, and would not have exposed himself to such risks.

The stubborn fact, however, remains that Ramusius should himself have ascribed such a fate to Verrazano. The Italian historian may have, perhaps, learned from Oviedo, that the Italian pilot of an English vessel was killed on our coast, and thus supposed the victim to have been Verrazano.

Oviedo, however, in his account of the visit of the English vessel, as quoted in the appendix, does not say a word about the death of its pilot, and has it that the vessel came from Brazil. It is however certain that it was the same vessel which is mentioned by Herrera, from the attendant circumstances being described exactly as told by Navarro. Oviedo places the visit in the year 1527, while Herrera erroneously puts it in 1519.*

As alcade or commander of the fort of the city of Santo Domingo after 1533, which had fired on the Englishman, he must have gathered many details on the spot, though his account is less full than Navarro's report, which was first published by Herrera in 1601, and which Ramusius, probably, never saw.

It might be suggested that the Italian historian was also a correspondent of the veteran navigator, Sebastian Cabot, and learned the story from him. But Cabot was engaged from 1525 to 1531 on his expedition to the *La Plata* river. He may have heard of the voyage of Rut

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* The Rev. B. F. De Costa dissents from this supposition, but he had not seen the account in Oviedo. See *Northmen in Maine*, p. 54.

afterwards, and of the death of his pilot, and learned his name.* Had it been Verrazano, and had he written to that effect to Ramusius, he would have added some authentic facts, which the latter would have recorded, leaving no uncertainty as to the date of his disappearance.

One more remark, and we close this part of our subject. If Verrazano had lost his life after his capture by the Spaniards or in the manner suggested by Ramusius, it would seem remarkable to find no allusion to his death on the planisphere of 1529. This map contains several legends on the American coast relating to him, and if he had died meanwhile, they would have been, no doubt, differently worded; or if he had been killed on that coast, Hieronimus would have added a legend to that effect. The voyage of 1527 was so recent that the mapmaker could have easily ascertained from Rut or his companions the precise locality where the scene had occurred.

From a consideration of all the above data, we must conclude that if Verrazano lost his life on our coast, it was not on the voyage made by the Mary of Guilford in 1527. Ramusius may be right in his account of it, but then it must have happened at a later date, which is possible, although no record has been preserved of voyages hither, by exploring vessels of any nationality, until 1534, when Jacques Cartier sailed around the Gulf of St. Lawrence, and in 1536 wintered on the river of the same name, near Quebec.

After the positively authentic appearance of Verrazano as a subscriber to the French expedition to the East Indies, and as its chief pilot, we lose sight of the Florentine completely. He may have died in the course of it, if it ever left the shores of France, but all speculations as to his occupations after this must be mere guesses,

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* A tale was told in Spain, concerning Cabot himself, somewhat similar to this one, namely, that he had been killed in a conflict with the natives, for which see Biddle's *Cabot*, p. 167.

though future researches may bring to light, as in the case of Sebastian Cabot and Jean Alfonse, some papers that might help to clear up the doubts which now surround his career. His name appears but once after the year 1526, and then in such a manner that no satisfactory inference can be drawn from it.

Tiraboschi, the author of a most valuable history of Italian literature, who was the first, as before stated, to draw attention to the Strozzi manuscript, also referred to a letter, printed in 1581,* among the collection of the epistles of Annibal Caro, as having a reference to Giovanni di Verrazano.

This, the seventh of the collection, is dated from Castro, October 13th, 1537, and is addressed to the inmates of the household of Mgr. Giovanni Gaddi at Rome, Caro being at that time the secretary of the Cardinal, and already distinguished for his literary and artistic tastes. It is written in a playful vein, and is of considerable length, describing the little journey he was making, in humorous terms. In the beginning, he speaks of having been left at home while his friends have gone to visit some caves, and to pass the time, he now addresses them, each in turn, in this epistle. The first one addressed is a Verrazano, in the following terms:

"To you, Verrazano, as a searcher (cercatore) of new worlds and of their wonders, I cannot yet tell anything worthy of your map, for we have passed no lands which have not already been discovered by you, or by your brother (fratello)."

The rest of the letter is meant to be amusing, but in the passage above quoted he is certainly addressing a real personage. Mr. Smith, in his *Inquiry*, assumes that

* The editions of 1572 and 1574, printed by Manucius in Venice, we have not seen. We quote from the one issued by the Giunti in Venice, Vol. I, pp. 6–9, entitled, "*De lettere familiari del Commendatore Annibal Caro. In Venetia, appresso Bernardo Giunti, e Fratelli, M.D.LXXXI.*" 2 vols. 8°, pp. 176 and 272.

Caro was at this time a tutor in the family of M. Gaddi, an opulent Florentine, and that he was addressing his pupils, and sportively referring to their studies. Annibal Caro was born in 1507, and coming of a poor but good family, he was compelled, after completing his studies, to become a tutor to the children of Ludovico Gaddi, in Florence. The cardinal, a brother of Ludovico, noticed him, and took him to Rome as his secretary. This was in or before 1537, consequently Caro was not addressing his pupils in Florence, but a household composed of men of considerable intelligence and learning. Hieronimus was, no doubt, one of the cardinal's protegés, and was, therefore, playfully addressed by Caro. It is hardly possible, now that we have the mapamundi of 1529 before us, to doubt but that the author was the *mapmaker* of the letter. The *fratello* may have been Giovanni, but, so far, no evidence to corroborate his being still alive in 1537 is known. Had he not been then in existence, however, the terms of the letter would probably have been differently worded.

In time, some proofs settling the vexed question of Verrazano's death may be discovered, but at the present time we know nothing that is convincing and satisfactory.

Verrazano was certainly alive in and after 1526, and was then only forty-six years old. He had been successful as a corsair, was an experienced navigator, and must have been a man of some mark and influence. Had he been captured and hanged, or had he met with the death described by Ramusius, the occurrence would certainly have been noted somewhere, and a document may yet be found, attesting the mode of his death, whether fortuitous or from natural causes. The discovery of this *mapamundi*, so long unknown, shows that we may yet hope to learn further details concerning the first explorer of our coasts. The land that can pride itself on having produced a Columbus, a Vespucius and a Verrazano, is no longer divided into petty states, rivals and jealous of

each others fame, but is a great and united empire. The memory of deeds done in the past by a Genoese or a Florentine, a Venetian or a Neapolitan, ought to be recorded as done by an Italian, and thus induce a more active inquiry into what is now obscure and neglected.

NOTES TO PAPER ON VERRAZANO.

I. Bacalaos.
II. Explorations for a Western Strait North of Florida, up to the year 1527.
III. Explorations of the Atlantic Coast of Florida from the South, 1510, 1526.
IV. Explorations for a Strait to the Westward in the Caribbean Sea and within the tropics.
V. Explorations in the Gulf of Mexico.
VI. Sebastian Cabot.
VII. Alonzo de Zuazo on a Strait to the Moluccas.
VIII. Hernando Cortes and his proposal in 1524 to search for a Strait.
IX. Estevan Gomez.
X. Identification of Juan Florin as Giovanni di Verrazano.
XI. Decades of the New World , by Peter Martyr.
XII. Letters of Peter Martyr.
XIII. Contarini on the French corsairs.
XIV. Herrera's Decades.
XV. Bernal Diaz del Castillo.
XVI. Oviedo on the capture of 1523.
XVII. Gomara on Florin.
XVIII. De Barcia on Juan Verrazano.
XIX. De Viera on Juan Florin.
XX. Cortes de Valladolid, 1523.
XXI. Cortes de Toledo, 1525.
XXII. Corsairs in the West Indies after 1527.
XXIII. Routes to and from the Indies.
XXIV. Suppression of geographical knowledge by Spain.
XXV. Family of Verrazano.
XXVI. Crignon, Parmentier, Estancelin.
XXVII. Desmarquets.
XXVIII. Ribault.
XXIX. Tavannes Memoirs, 1536.
XXX. André Thévet, 1557.
XXXI. François de Belle-forest, 1570.
XXXII. Italian versions of the Heading to the Letter.
XXXIII. Cosmographical portion of the Letter.
XXXIV. Notes on the cosmographical portion of the Letter.
XXXV. Examination of the Voyage across the Atlantic.

XXXVI. Thomassy.
XXXVII. Description of the Mapamundi by Hieronimus de Verrazano.
XXXVIII. Charts after Verrazano.
XXXIX. New France, of Verrazano.
XL. Gastaldi, 1548, Mercator, 1569.
XLI. Ramusius.
XLII. Admiral Chabot and Verrazano.
XLIII. Oviedo on the English voyage of 1527.
XLIV. Herrera on the voyage of 1527.
XLV. Hakluyt on Rut's voyage of 1527.
XLVI. Tiraboschi.
XLVII. Carli's letter.
XLVIII. Jean Alfonse, and his death.
XLIX. Buckingham Smith's notices of Verrazano's voyage.
L. Dr. J. G. Kohl on Verrazano's voyage.

NOTES.

I.—BACALAOS.

Numerous derivations have been suggested for this word, which is simply an old Mediterranean or Romance name, given to the preserved Codfish, when it has been dried and kept open and extended by the help of a small stick. This was the Stockfish of the North, and from the word *baculum*, it became the *Bacalao* and *Baccalieu* of the South of Europe. The *baculum* or rod was an attribute of the Gods Bacchus and Mercury, being perhaps a synonym of the first, in allusion to the rod supporting the grape-vine. Many words of Latin origin can be traced to this and the Greek *βάχος*.

Another root, the Sanscrit *cad* or *gad*, a stick, is found in the Greek and Latin name of this fish as *Gadus*. The English word *goad* shows the same root, and gives the English name Codfish.

The Holland word *Gabel*, a fork, Latin *gabalus*, is the root of the word *Cabelyau*, the Batavian name of the Codfish.

Other varieties of the dried Cod are known as *Dunfish*, because dried on the downs or *dunes; Klipfish* when dried on the cliffs or *klippen: Tusk* or *Torsk* when dried by the help of fire, from *dorren*, Norwegian to dry, past part. *gedorr*.

The French name *Morue*, for the Codfish, is of uncertain origin. It may be from *Mor*, a Gothic name for the sea, having the same root as *Mare*, *Mer*, etc. The French name for wet salted Cod is *Morue verte*, perhaps from its being procured from the *Isle Verte*, which is, as we believe, one of the earliest names given to Newfoundland, and may be found there still in the name *Banc au vert*, or green bank, South of the Island. We shall endeavor to show at another time that the Banks were visited for their fisheries, and were well known in the early part of the fifteenth century.

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I.—BACALAOS.

Numerous derivations have been suggested for this word, which is simply an old Mediterranean or Romance name, given to the preserved Codfish, when it has been dried and kept open and extended by the help of a small stick. This was the Stockfish of the North, and from the word *baculum*, it became the *Bacalao* and *Baccalieu* of the South of Europe. The *baculum* or rod was an attribute of the Gods Bacchus and Mercury, being perhaps a synonym of the first, in allusion to the rod supporting the grape-vine. Many words of Latin origin can be traced to this and the Greek βάκχος.

Another root, the Sanscrit *cad* or *gad*, a stick, is found in the Greek and Latin name of this fish as *Gadus*. The English word *goad* shows the same root, and gives the English name Codfish.

The Holland word *Gabel*, a fork, Latin *gabalus*, is the root of the word *Cabelyau*, the Batavian name of the Codfish.

Other varieties of the dried Cod are known as *Dunfish*, because dried on the downs or *dunes; Klipfish* when dried on the cliffs or *klippen: Tusk* or *Torsk* when dried by the help of fire, from *dorren*, Norwegian to dry, past part. *gedorr*.

The French name *Morue*, for the Codfish, is of uncertain origin. It may be from *Mor*, a Gothic name for the sea, having the same root as *Mare*, *Mer*, etc. The French name for wet salted Cod is *Morue verte*, perhaps from its being procured from the *Isle Verte*, which is, as we believe, one of the earliest names given to Newfoundland, and may be found there still in the name *Banc au vert*, or green bank, South of the Island. We shall endeavor to show at another time that the Banks were visited for their fisheries, and were well known in the early part of the fifteenth century.

II.—EXPLORATIONS FOR A WESTERN STRAIT TO THE NORTH OF FLORIDA, UP TO THE YEAR 1527.

The early explorations of the Northmen from Greenland, and the fishing voyages of the Bretons and others, were not made in search of a strait, and are not here noticed.

1476. *Johann von Kolno* or *Scolnus* said to have been sent by Christian II of Denmark, to search westward, and to have reached land west of Greenland.

1490–96. Bristol men attempt at various times to sail out westward, but find no land.

1497. *Sebastian Cabot* leaves Bristol in May, with one vessel; passes to the South of Isle Verte or Bacalaos, and enters the gulf behind it June 24th, searching for a strait to the West; sails around the gulf, passing out through the Strait of Belleisle, and reaches home about August 10.

1498. *Cabot* is said to have made another voyage with uncertain results. Probably coasted north of lat. 52 deg.

1500. *Juan Dornelos*, said to have been sent from Spain to explore to the Northwest.

1500. *Gaspar Cortereal* leaves Lisbon with one or two vessels, in May, and sails North of Bacalhaos to Labrador, but does not land there, being absent about five months.

1501. *Gaspar* leaves again, May 15th, with three vessels and lands in Labrador. He is lost, but the other two vessels reach home about the middle of October, bringing seventy of the natives.

1501. An English expedition said to have visited Terra Nova, guided by Portuguese.

1502. *Miguel Cortereal*, brother of Gaspar, leaves May 10th with one vessel for Bacalhaos, and is not again heard of.

1503. Two vessels said to have been sent to search for the Cortereals, which perhaps survey the coast from Cabo Raso to Bonavista.

1504–6. *Jean Denis* leaves Honfleur with *Gamart* of Rouen as pilot, and explores the Island of Newfoundland, North of Bonavista.

1508. *Thomas Aubert*, of Dieppe, in the Pensee, visits Newfoundland.

1512. *Juan de Agramonte*, commissioned by Queen Juana of Castile, to explore to the Northwest, with two Breton pilots.

1524. *Giovanni di Verrazano*, in the employ of Francis the First, after an unsuccessful attempt in 1522, leaves Madeira January 17th with one vessel, sights the New Jersey coast of the United States, and explores these shores from lat. 39 deg. to 44 deg., and reaches Dieppe July 4th.

1525. *Estevan Gomes*, a Portuguese in Spanish employ, leaves Corunna with one vessel, traces the American coast from North to South, from lat. 44 to 34, and reaches Corunna in December, bringing home a number of the natives.

1526. *Nicolas Don* (D'aunis?), a Breton fisherman, is driven by gales Southwest from Cape Breton, and believing that he has discovered new coasts, offers to explore them for the Emperor.

1527. *John Rut*, with *Albert de Prato* as pilot and cosmographer, leaves the Thames, May 20th, with two vessels, the Mary of Guilford and the Samson, to search for a strait westward. The Samson is lost in June, and her consort puts into St. Johns, Newfoundland, where they found Norman, Breton and Portuguese fishing vessels, and then coasted to Florida, visited Hispaniola and Porto Rico, reaching home in October.

III.—EXPLORATIONS OF THE ATLANTIC COAST OF FLORIDA, FROM THE SOUTH, 1510–1526.

1510 or before. Terra or Isla de Bimini (Bahama or perhaps Florida) discovered.

1513. Juan Ponce de Leon, with the pilot Alaminos, discovers the mainland of Florida, coasting its gulf shore to lat. 24 deg., and the Atlantic shore to near lat. 30 deg. On his return he has to stem the Gulf Stream, gets entangled among the Bahamas, and finds the pilot Diego Miruelo the elder exploring them.

1520. The Licentiate Lucas Vasquez de Ayllon, one of the Auditors of Hispaniola, sends two vessels from Puerto de Plata, on the North side of Cuba, to capture slaves along the coast of

Florida. One of his vessels said to have been commanded by Captain Jordan, with Diego Miruelo as pilot, the other by the pilot Pedro de Quejo. This last one reaches in lat. 34 deg., August 18, Cabo de Sta Elena (Cape Fear) and probably farther still.

In company with the last one of Ayllon's vessels there went a small vessel, sent by another of the Auditors, Juan Ortiz de Matienzo, under the pilot Fernando Sotil, for exploration, which went as far as lat. 34 deg. also.

1521. De Leon having a royal grant to colonize Bimini and Florida, makes an expedition with two vessels from St. Juan (Porto Rico).

1521. Ayllon said to have again sent two vessels to Chicora, which appear to have coasted as far as Bahia Santa Maria (Chesapeake Bay).

1523. June 26, Ayllon obtains a royal grant to colonize Chicora and other provinces, between 35 deg. and 37 deg., but delays acting under it.

1526. Ayllon takes the command of a large expedition, consisting of one large and three smaller vessels, with two boats, manned or carrying 500 men and 80 or 90 horses. Leaves Puerto de Plata with Pedro de Quejo as pilot, in middle of July. The larger vessel is lost entering the Rio Jordan (Cape Fear R.), winters at Guadalpe, some 40 or 50 leagues to the S. W. (Pedee R., Georgetown?). Ayllon died October 18, leaving his nephew Juan Ramirez as Governor. The dissensions that arose after his death and the many deaths from disease and cold, cause the abandonment of the enterprise, and 150 men only get back, the body of Ayllon being lost on the way by the foundering of one of the small vessels.

A careful and close analysis of the Maps of 1527 and 1529, of Hernando Colon and Diego Ribero, was published in 1860, by Dr. J. G. Kohl. The names on the Maps are compared by him with the known documents that illustrate their origin. We must refer to this able work for critical details which lie beyond the scope of this paper.

IV.—EXPLORATIONS FOR A STRAIT TO THE WESTWARD, IN THE CARIBBEAN SEA AND WITHIN THE TROPICS.

1492. Christopher Columbus, sailing westward, discovers islands, and reaches to Nuevitas on the north side of Cuba.

1493–96. Columbus sails on his second voyage, but only reaches the Isle of Pines on the south side of Cuba.

1498–1500. Columbus on his third voyage discovers the mainland of South America, near the Island of Trinidad, coasting to Margarita.

1499–1500. Alonzo de Hoyeda, with Juan de la Cosa and Americus Vesputius, touches S. America, and coasts it to lat. 3 deg. North.

Alonzo Nino and Christoval Guerra: uncertain as to point reached.

Vicente Yanez Pinzon reaches to lat. 8 deg. 20 min. South of the Equator, on the coast of S. America.

1500. Diego de Lepe searches South of Cape St. Augustine.

1500. Pedro Alvarez Cabral, with a Portuguese fleet, on his way to the East Indies, discovers the East coast of Brazil.

1500–1502. Rodrigo de Bastidas with Juan de la Cosa, coasts the mainland of S. America, to Cape San Blas on the isthmus.

1502–3. Hoyeda, with Juan de Vergara, follows the same coast to Curaçao.

1502–4. Columbus on his fourth voyage explores the coast of the Caribbean Sea from Guanaza and Ruatan Is. to near the Gulf of Darien.

1504–5. Juan de la Cosa visits the Gulf of Uraba.

1505. Hojeda visits the coast near Caquibacoa.

1506 or 7. Vicente Yanez Pinzon and Juan Diaz de Solis sail west from Hispaniola, and explore the coast of Yucatan, from Golfo Dulce to the Rio de Lagartos on the North shore.

1508–9. Pinzon and De Solis reach lat. 40 deg. S., on the coast of Brazil.

1511. Peter Martyr's map appears: the first Spanish one of the West Indies published up to that date. It contains all the West Indian discoveries up to the year 1508.

1513. De Balboa discovers the Mar del Sur.

1524. Gil Gonzales Davila sent from Hispaniola to search for a strait about Golfo Dulce.

V.—EXPLORATIONS IN THE GULF OF MEXICO.

Columbus on his first voyage in 1492 was steering along the parallel of 28 deg. directly for the coast of the United States, and if he had not turned to the Southwest, would have made land about Cape Carnaveral in Florida. On this voyage he explored part of the North coast of Cuba, which he believed to lie Northwest and Southeast.

On his second voyage in 1494 he sailed along the South coast of the same Island as far as the Isle of Pines. Here he paused and prepared a declaration, which he forced all his companions to sign, to the effect that Juana (as he called it) was a long peninsula jutting out from Asia.*

The Map which he presented to the Pope and to Rene of Lorraine about 1498, is now lost, but it was no doubt copied by Johann Ruysch in his Mapamundi attached to the Roman edition of Ptolemy of 1508. Much altered, it was copied by Hylacomilus as the Tabula Terrae Novae in the Strasburg Ptolemy of 1513. In this last Cuba appears twice, the St. Die geographer having inserted Isabella between the Cuban peninsula of Columbus and Espanola, its insular character being then recognized. Johann Schoner on a globe of 1520 has also a copy of the Columbus Map of 1498.

Of the names attached to the Cuban peninsula on these three sketches, which are a part of the hundreds, which Columbus gave to points on the coast,† we have identified nearly all, as names which were familiar to the discoverer from his Mediterranean experience. Thus we find names altered by copyists, but which can be recognized, such as Fin de Apulia, Cabo del Gato, Cabo Melle, de Lucca, de Livorno, d' Arles, de Como, de Parma, d' Alicante, etc.

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* Navarrete. Coleccion de los Viages, &c., II, 143.

† See third voyage of Columbus.

It soon became known that Cuba was an Island, apparently from what Peter Martyr says, before 1500, though it was not circumnavigated officially until 1508, by order of Sebastian de Ocampo.

The last voyage of Columbus in 1502, completed the exploration of the shores of the Caribbean sea to Guanaja or Roatan I. Vincente Yanez Pinzon and Juan Diaz de Solis, on a voyage of adventure in 1507, sailed along the East coast of Yucatan from the Golfo Dulce to the Rio de Lagartos, and this last limit of northern exploration in this quarter is given on Peter Martyr's little Map of the West Indies, accompanying his first Ocean Decade of 1511.*

In 1513 (not 1512) Juan Ponce de Leon discovered Florida. Alaminos was his pilot, and together they coasted the Atlantic shores of it, to near the mouth of the present St. Johns river, in lat. 30½ deg. The fair open channel, with the swift current running through it from the South, was observed by the pilot and used by him, as will be seen below.

Vasco Nunez de Balboa crossed the Isthmus and discovered the Mar del Sur in the same year last mentioned, and it would seem a natural supposition to have at once sought for a passage into it North of the Rio de Lagartos, but this was not done.

Francisco Hernandez de Cordova, February 8th, 1517, accompanied by the pilot Antonio de Alaminos, who as a boy had been with Columbus, and to Florida with De Leon, sailed west from Havannah and struck Cape Catoche; then coasted west and southwest to the Bahia de Malapelea in Campeachy, where the natives repulsed him and he turned back. He gave to Yucatan its present name, but considered it an Island. On his voyage home he landed in Florida.

In 1518, Juan de Grijalva, by order of Diego Velasquez, his uncle, the first Governor of Cuba, explored the coast with Alaminos, beginning with the Island of Cozumel, and ending apparently at Cabo Rosso in lat. 21 deg. 45 min. near Tampico.

He brought home a large amount of gold, and exciting accounts of a vast and rich empire in the interior of the land he

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* See Martyr, Dec. II, Cap. 7; Herrera, Dec. I, Lib. VI, Cap. 17; Docum Ined, 1842, 501.

had discovered; and in the following year (1519) the famous Hernando Cortes, burning for its conquest, with Alaminos again as pilot, undertook the expedition which resulted in the subjugation of Mexico.

The first vessel despatched to Spain, with treasure, by Cortes from Vera Cruz, July 26, 1519, passed into the Atlantic through the Florida Channel. Alaminos, her pilot, the discoverer of this passage,* in 1513, was the first who led a vessel through it to Spain.

In the same year† Francisco de Garay, Governor of Jamaica, and the rival of Cortes, either in person or by his deputy Alonzo Alvarez de Pineda, ran along the coast to the Rio de Panuco or Palmas, in lat. 23 deg. 45 min.

In 1520 De Garay sent Diego de Camargo north, in the gulf, with three or four caravels, and the exploration of the coast appears to have been begun somewhere about Pensacola, so as to very nearly connect it with the Florida of Juan Ponce, and was carried westward to Panuco, if the Map and memoir that he presented to the Emperor can be trusted. (See Navarrete III, 147–8, and Martyr Dec. V, cap. I.)

In 1523 De Garay went in person to the Rio Panuco, with Diego Meruelo the elder as his pilot.‡ It would appear, however, that De Garay's explorations remained unknown to Cortes, for in his letter to the Emperor of 1523, he is uncertain whether Mexico and Florida were joined together.

The short unexplored coast line, from Pensacola to Apalachicola, appears not to have been traced until the unfortunate Pamphilo de Narvaez landed on the coast of Florida in 1527,

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* Herrera, Vol. I; Descripcion, p. 4; Barcia Ensayo, p. 154.

† Gomara II, cap. 25, says 1518, which is improbable. Pineda was one of the malcontents accompanying Cortes in 1518, and who conspired to abandon him. Two of them were sentenced to death; the pilot De Umbria to have his feet cut off; Pineda, another pilot, and his brother to receive two hundred lashes, etc. De Umbria seems to have remained after this in the service of Cortes, but Pineda got away and entered the service of De Garay.

‡ Diego Meruelo had been sent by Lucas Vasquez de Ayllon in 1520 to the Rio de Chicora, and, according to Barcia, lost his life there with Ayllon in 1526. His nephew, of the same name, went as stated, with Narvaez to Apalache.

and his pilot Diego Meruelo the younger had coasted in search of him, finding the land running East and West, thus positively connecting the above provinces. The exploration of the Gulf of Mexico was therefore spread over a period of twenty years, while it might have been accomplished in as many days.*

VI.—SEBASTIAN CABOT.

It is now certain that Sebastian Cabot never sailed along the coasts of the United States South of Nova Scotia. The English have often claimed that he did so in 1497 or 1498, and upon this shadowy basis founded a right of possession by discovery. Cabot himself never published any statement to the above effect, but his papers, which Hakluyt says were in the hands of a certain William Worthington, as late as 1582, are now lost. Had he made such an exploration, Hakluyt would not have been satisfied with the meagre parade of hearsay reports, on which he claims such discovery. A very important note by a friend of Cabot, given below, and published during his lifetime, is suppressed by Hakluyt, while he attaches weight to the perhaps ill understood report made by Cabot to Peter Martyr in 1515.†

Had Cabot really thus visited this coast, from Newfoundland to Florida, he would of course have been appealed to as an authority by the Congress of Bajadoz in 1524, of which he was a member when the question of searching for a strait about there was considered. His silence at that time is of itself conclusive on this point.

We have carefully investigated the older and the more recently published accounts of Cabot's voyage of 1497, and shown that his land-fall was Cape North on Cape Breton Island, that he got embayed in the Gulf of St. Lawrence, and came out of it through the straits of Belleisle, whence he sailed back direct to England.‡

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* See Oscar Peschel's excellent resume on the discoveries in the Gulf of Mexico, *Zeitalter der Entdeckungen* 1858, Cap. 7.

† Martyr Dec. III, Lib. VI.

‡ Historical Magazine, New York, March, 1868.

Over-estimating the distances sailed inside the Gulf, he meant to inform Martyr that he had sailed West to the meridian of Cuba, and the good historian no doubt added that he had reached South to the Latitude of the straits of Gibraltar, misunderstanding the range of the voyage. That Cabot himself did not claim to have sailed so far South is also definitely proved by a passage hitherto neglected because unfavorable to the English claims in the preface to Richard Eden's Decades, 1555, sig. c. i.

"These regions are cauled Terra Florida and Regio Baccalearum or Bacchallaos of the which you may reade sumwhat in this booke in the vyage of the woorthy owlde man yet lyuing Sebastiane Cabote, in the vi. booke of the thyrde Decade. But Cabote touched only in the north corner and most barbarous parte hereof, from whense he was repulsed with Ise in the moneth of July."

Written under Cabot's own eye, and perhaps dictated by himself in order to rectify Martyr's misstatement of his claims, it would seem to set the question at rest most completely. Hakluyt in his passages, gathered after Cabot's death, to back the English claims, omits this distinct limitation of Cabot's discoveries, and even Richard Biddle, in 1831, does not seem to have observed it.

Cabot corresponded with Ramusius, and perhaps had corrected the statement made by Martyr, for in the Somario of Martyr's three first Decades, made and published by the Italian historian in 1534, it is not repeated. That Ramusius was aware of the real extent of Cabot's explorations is also evident from the Introductory "Discorso" to his third volume of 1556, written in 1553, while Cabot was still living, in which no mention is made of his explorations South of New France. Hakluyt, of course, did not notice these omissions, as they would have led to the plain inference that we here point out.

Cabot's own planisphere, of which but one copy, discovered in 1843 by Von Martius, is now known, preserved in the French National Library, shows distinctly his Prima Vista to be Cape North, and he places no other name of his own on this coast, excepting to the Island of St. John (Prince Edward's?), just west of the cape and inside the Gulf.

Verrazano was therefore the first one that we know to have sailed along our coast, and his name deserves to be attached to some prominent point of it.

VII.—ALONZO DE ZUAZO ON A STRAIT TO THE MOLUCCAS.

Although the following passage more directly belongs to another subject, we quote it to show how intelligent minds were at a certain period of time endeavoring to solve a problem which was not fully answered until Magellan's ship had circumnavigated the globe. It has but recently appeared in Spanish (Doc. Ined., 1864, p. 296), copied from the Archives of the Indies in Seville.

The Licentiate Alonzo de Zuazo, the legal adviser of the three Jeromite friars who were sent by the Regent, Cardinal Cisneros, in 1516, to Hispaniola to govern the West Indies, and who is best known as the mediator between Cortes and Narvaez, wrote to the Emperor, January 22d, 1518:

"In another matter there is a great mystery [*secreto*]. The concession of Pope Alexander is known; the partition of the world as if it were an orange between the King of Portugal and the grand parents of Your Majesty by certain imaginary lines which were not drawn, because although they sent certain pilots to mark a boundary and fix those lines at the points where they ought to be, as this was a division by longitudes, of which the pilots know nothing and practise nothing, they could not and knew not what to do with certainty, and therefore returned without accomplishing anything.

"While drawing the lines, I found that your Majesty was much wronged in the Tierras Firmes of Brasil. From Cape St. Augustine thirty leagues at best may belong to the King of Portugal, and he possesses more than two hundred, from which he yearly receives more than twenty thousand ducats in brasil [*wood*] and slaves. I, to make sure of it, sent a pilot at my cost to the said Cape, and I found that its position on the Maps was more than a hundred and thirty leagues too much to the East.*

"There is another mystery. In the East, Portugal possesses much which belongs to Your Majesty. The City of Malaca itself, which has 25000 inhabitants, belongs to you, as it would appear, from that Mapamundi which Americo caused to be printed, who went to those parts: the [same] which the Senor Infante † has in his chambers, in a circular form.

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* The good Zuazo deceived himself on this point. See "*Die Theilung der Erde, &c.*, by Oscar Peschel, Leipzig, 1871. Bulletin de Geographie, and Kohl's text to *Die ältesten general karten von Amerika*, Weimar, 1860.

† The Spanish editors, in a note, say that this must have been Don Fernando, brother of Charles the Fifth and afterwards Emperor of Germany.

A printed Map of the world, compiled by Americus Vespuccius, is not now known. Zuazo may probably have seen a Map drawn by hand for or by Vespuccius.

"That Your Majesty may not mourn over this, as did Alexander to call himself master of other worlds, you must first order the division to be made: and secondly fit out two small fast sailing vessels to examine it all (meanwhile the strait which I have heard of in Tierra Firme may be verified, and Diego Alvitez, recently from there, has said it was so), and they can sail along the coast to the South,* or reach that which comes from the North (*hacerse en la Costa del Sur o llevarse a ella de la de Norte*) as Vasco Nunez has been doing."

VIII.—HERNANDO CORTES, AND HIS PROPOSAL, IN 1524, TO SEARCH FOR A STRAIT.

The letter, known as the fourth *carta-relacion*, sent by the Conqueror of Mexico to the Emperor, contains an interesting passage relating to a proposed search for *the strait*, between Florida and Bacalaos. From the date of the letter, October 15, 1524, it appears that Cortes had heard of the geographical congress met at Bajadoz, and wished to please the Emperor by causing explorations to be made in both oceans for it. A good version of the extract may be found in Biddle's Cabot, Chap. VII, copied by Conway Robinson, in his work, "An account of discoveries in the West until 1519, and of voyages to and along the Atlantic Coast of North America, from 1520 to 1573. Richmond, 1848," page 300.†

We give below an abridged version from the Spanish text in Gayangos.

"I have informed you in the earlier part of this letter of the parties sent by sea and by land, which I hope may meet with success, as I wish to serve your Majesty in every possible way. All that I see remaining to be done in that way is to learn the secret of the coast remaining to be discovered, between the Rio de Panuco [Lat. 23 deg. 45 min.] and La Florida,‡ which last was discovered by Juan Ponce de Leon; and thence along the North-

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* Zuazo does not seem to have heard of the voyage of Juan Diaz de Solis in 1516 along the coast of South America.

† This work deserves wider circulation and notice. Robinson consulted many original authorities, and gives an admirable resumé of the subject.

‡ Cortes had not learned of the explorations of Alonzo de Pineda in 1519, and of Francisco de Garay in 1520, by which the Gulf Coast had been completely traced.

erly coasts of said Florida as far as the Bacallaos.* It is certain that along those coasts there is a strait that passes through to the South Sea. If found, it will be seen that it comes out very near to that archipelago which Magellan discovered,† according to a certain Map [figure] which I possess ‡ of those parts. Should a strait be found about there, it would be of great value in reaching the Spice Islands by a route shorter than any other by two thirds, and also because it would pass through lands now owned by your Majesty. Although much in debt for the cost of the expeditions already sent out, and for the expenses of this Government, I have resolved to send three caravels and two brigantines out on this undertaking, but it will cost me over ten thousand gold pesos. This will be the greatest service of the kind I have done, if as I say the strait should be found, but even should none be met with, it must happen that many great and rich lands will be discovered, which will increase your Majesty's possessions.

"There is also a negative advantage in case no strait be found, in that your Majesty can then determine what measures will be best in regard to the use of the Spice Islands and lands adjacent to them. In such a case I offer my best services, which will cost your Majesty but little, in carrying out your orders. Please the Lord, the strait may be found, and I will do all I can towards that end.

"I mean to send the vessels on the South sea to explore the coast, simultaneously with those in the North sea.§ The first will follow the coast until they find the strait or connect the shore line with that discovered by Magellan, and the last until they come to the Bacallaos."

Cortes at this time conceived Nova Hispania to be a part of Asia, but by the year 1540 he had explored the coast so far North as to make it nearly certain that North America was a continent by itself.

Oviedo, Lib. xxxiii, Cap. xli, Ed. Acad. 1853, p. 456, remarks on this letter:

"I take Cortes to be better as a Captain, and more versed in warlike matters, such as we have been describing, than as an expert cosmographer, for all what he says; for the strait of Magellan is very far from the point he speaks of, and very far from being placed where Cortes, according to his

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* Neither had he heard of Leon's and Ayllon's undertaking on the Atlantic coasts, which had reached to about 34 deg. N. Lat.

† Probably Magellan's I. de Ladrones (the Marianas?) or the Philippines. He could hardly mean the Desventuradas.

‡ No map by any of the companions of Magellan is now known. Their track was perhaps copied by Agnese, on Maps described in this Note.

§ It does not appear that Cortes sent out these last vessels. His explorations in the Pacific, actively pursued, do not bear on the subject.

say or his Map, which he says he has, wishes to make it, and there can be no doubt about this now" [1541].

Oviedo in this sneer displays much ignorance, for Cortes was speaking of an undiscovered strait that might be found in the North, and whose Westerly opening might not be far from the Philipines or Ladrones; a plausible conjecture, which the Map recently described by Prof. Peschel explains quite clearly.* This little Mapamundi, which is preserved in Munich, seems to be the work of Baptista Agnese, and a duplicate of it from Dresden, is given by Dr. Kohl (Maine, No. XIV), who had seen still another in the British Museum; this last one signed by Agnese and dated 1536. Another Map from the Bodleian Library, Oxford, given by Dr. Kohl (Maine, XV, c), drawn, perhaps, by Agnese also, shows a Northern strait between Terra de los Baccalaos and Terra de los Bretones, much as Cortes may have imagined it to be. § There is a small Mapamundi, which may best illustrate the geographical views of Cortes, prepared by Gaspar Vopellius, and inserted by Hieronimus Girava in his *Cosmographia*, which appeared in Spanish at Milan, 1556, and again at Venice in 1570. On this Map, in which *Nueva Espana* is joined to *India Oriental*, the *Malucas* are placed on the Equator, some forty degrees West of the longitude of Mexico, and close to the American coast, which is made to run almost East and West from Panama to the Ganges.

IX.—ESTEVAN GOMEZ.

Estevan Gomez, a Portuguese pilot, entered the service of the King of Spain, offering to discover a western sea way to the Spice Islands, but Fernan Maghalhaens was preferred to the command of the expedition, with Gomez as his first officer. When half way through the Strait, Gomez, who had been made pilot of a vessel commanded by Alvaro de la Mesquita, abandoned the expedition, arrested Mesquita and returned to Spain. Pending the settlement of their dispute, the two were sent out in 1523 with a fleet fitted out to pursue the French corsairs. Later,

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* *Italienische Weltkarte, etc.*, *Leipzig*, 1872.

Gomez prevailed upon the Emperor to fit out a vessel for the discovery of a Strait North of Florida, between lats. 37 deg. and 44 deg. He was detained by having to attend the Geographical Congress of Bajadoz, appointed to determine the mutual claims of Spain and Portugal to the Moluccas, and also, it is said, by a remonstrance against his enterprise from the Portuguese King, who claimed Newfoundland as falling within the demarcation line of 1515. The Congress sat from March 1 to May 1, 1524, and perhaps longer. The commission to Gomez was not signed until February 10, 1525, and he probably sailed within a few days after that date, leaving Corunna with one vessel. No trustworthy account of his voyage has ever appeared. Spanish authors treat of it in general terms, and the *Tierra de Gomez* appears on Spanish Maps afterwards, but it is uncertain what extent of coast was explored. It appears that he searched it from Newfoundland to Florida, being absent ten months, returning in December, unsuccessful in the main object of his voyage.

A paper entitled "Hernando Magallanes and Estevan Gomez, pilots who sought a Western strait to India," was read June 5, 1866, before the New York Historical Society, by the late Buckingham Smith, which is briefly reported in the Historical Magazine, Vol. X, 1866, p. 229. Mr. Smith appears to have learned that a full account of the voyage was to be found in an unpublished work by the geographer Cespedes, who wrote near the close of the sixteenth century, containing full details of it, but was unsuccessful in finding it, nor had Munoz or Navarrete seen it.

Andres Garcia de Cespedes was the author of several geographical or mathematical works, enumerated by Leon y Pinelo in his Epitome of 1629, pp. 140, 148 and 184. One of these is entitled Regimento de Navegacion que mando hazer et Reg. N. S. por orden de su Consejo real de las Indias. Madrid, 1606, folio. This work does not contain the full voyage of Gomez. Another one, perhaps containing it, is his "*Isolario general*," in manuscript, present owner unknown.

X.—IDENTIFICATION OF JUAN FLORIN AS GIOVANNI DI VERRAZANO.

In the Spanish accounts of his exploits as a corsair, he is always called *Juan Florin* or *Florentin*. Peter Martyr first mentions him as *Florin*, in the sixth chapter of his eighth Decade, written 1525, but first printed in 1530. Though mention is often made of the French *pirates*, from the eighth chapter of the fifth Decade (written in 1521), to the end of the work, and especial stress is laid (Dec. VIII, cap. IX) on the safe arrival of the treasure ships at the end of July, 1525, guarded by the fleet sent out to convoy them, he omits any allusion to the capture of Juan Florin. Such a matter would hardly have escaped his notice, nor does he mention it in his letters.

These letters were first printed in 1530. The first notice of the leader of the pirates by name, is in one dated November 19, 1522, where he is simply called *Florinus*, a French pirate. In June, 1523, he speaks of *Joannis Florini*, the French pirate, and he is last mentioned by name in August, 1524, though the French pirates are spoken of later in the year.

All that can be negatively inferred concerning the capture of Florin, from Peter Martyr, is that in this last letter of November 18th his name does not appear.

Ramusius does not appear to have seen the full edition of the Decades, of 1530, nor the letters either, for in the Italian Somario of 1534, which, as Mons. Davesac* has recently shown, was prepared by him, he had only the three first Decades (as published in 1516 in Spain, in Basle in 1533, and Cologne 1574) before him. Nor does Ramusius appear ever to have seen these last five Decades. Had he seen them, he would perhaps have recognized Verrazano under the names which Peter Martyr uses, when speaking of him. The full editions of Martyr's Decades and Letters do not seem to have left Spain for many years, and were perhaps jealously guarded from general circulation for more than fifty years, since in 1574 but three Decades were reprinted, and not till Hakluyt published at Paris in 1587, the whole eight, do they seem to have been quoted by authors generally.

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* Davesac. *Bull. de Géog.*, July, 1872, p. 10, note.

Oviedo does not, but Gomara does name Florin, and as a pirate his name does not appear in any published Spanish or other work until Herrera (Dec. III, Lib. IV, cap. XX), in 1601, speaks of him as *Florin de la Rochela*, captain of six armed vessels. In the same Decade (Lib. VI, cap. IX), he gives the voyage of Juan Verraçano Florentin, from Ramusius, without a suspicion that these names belonged to one person.

The next printed reference to him as a corsair, is in Bernal Diaz del Castillo, whose narrative of the Conquest of Mexico, written in 1568, was not printed until 1632. He calls him *Juan Florin* and *Florentin*, a French corsair, and gives the first published account of his capture and execution.

De Barcia, in his Ensayo Cronologico de Florida, 1723, was the first to identify the corsair with the discoverer. He calls him Juan Verrazano Florentin, Corsario de Francia, and gives a very brief notice of his exploring voyage, from Ramusius, and of his exploits under the name of Juan Florentin, alludes to the report of his death in America, and then gives the story of his capture and execution, apparently from Bernal Diaz.

Thus two centuries had elapsed before this identification was made, during all which period no one had even suspected it. The heading of his own letter, first published in 1556, might have awakened a surmise to this effect, and possibly the Spanish Government knew the truth, but it is curious that the fact should have been so slow in finding its way into print.

XI.—DECADES OF THE NEW WORLD, BY PETER MARTYR.

Translated Extracts from the Decades of Peter Martyr concerning French pirates.

Dec. V, Cap. 8 [1532; and written about the same time as his letter of November 19]. "Of these two" [hidalgos who had served under Cortes], "Benavides, leaving his companions, returned recently in one of the two ships sent by Cortes. In them gifts are brought, which are said to be far more precious and beautiful than those which came in the year when his Majesty went to Belgium, and seen by your Reverence. They estimate these

treasures to be worth about two hundred thousand ducats, but these ships have not yet reached us. They have stopped at the Cassiterides, called the Azore Islands by the Portuguese, the sovereigns thereof, to avoid falling into the hands of French pirates, as happened to one coming last year from Hispaniola and Cuba loaded with Gold of the weight of Seventy-two thousand ducats, of precious pearls six hundred eight ounce pounds, and two thousand arrobas of sugar. The Spanish arroba contains twenty-five six ounce pounds. Many brought individually much besides, all which became the booty of the pirates. An armed fleet has been sent, which is to bring these two safely from the Azores. These ships bring, as Benavides reports, three tigers.

Two gentlemen, captains in the wars in those countries, remain in charge of these ships, Alfonso de Avila and Antonio Quignones, carrying the gift to the King from the people, but the share of Cortes is entrusted to Juan Ribera, private Secretary of Cortes, and his companion in all his labors from the beginning. News has recently been brought that fifteen ships of the French pirates were seen cruising on the Ocean, expecting to lay hands upon these ships as they did with the other, but that they were driven by storms on the Coast of Africa, and that many of them were drowned."

Cap. X (1522)., "....but there is a rumor of uncertain origin, that the French pirates have already got scent of those ships; may God bring it out aright."

Dec. VI, Cap. X (1524). "The troubles of these times, due to the various pirates and the hostilities with the French King, have put a stop to our communications both by land and by sea."

Dec. VII, Cap. IV (1524). "They say that Cortes has 300,000 pesos ready to send to Cæsar.....but learning of the capture of so many laden ships by the French pirates, hardly ventures to despatch these. Thus, while in our Council of the Indies, counsel was being held on the measures to be taken for the safety of these ships, it was resolved, and provided by Cæsar upon our petition,* and ordered that they should gather, as fast as each one was laden, at Hispaniola as a rendezvous. The ships being gathered from all those lands, a strong fleet would thus be formed,

* See Cortes de Valladolid.

which would be safe from the attack of pirates if they had to defend themselves. What fate is to befall the armament is to be determined by Divine Providence."

Cap. V (1524). "While I am writing of these things, word is brought that four ships from the Indies have arrived on our Spanish coasts. What treasures they bring we have not heard."

Dec. VIII, Cap. IV (1525). "They say that Cortes is still deploring the loss of those great treasures, captured by the French pirates about three [two?] years ago, which he was sending to Cæsar. But what shall we say concerning the gems and precious stones? Passing over the rest, there was a pyramidal emerald, whose base was nearly as broad as the palm of a man's hand. It was told to us in the Council and to Cæsar that such an one had never seen by human eye before. It is said that the French Admiral purchased it at an incredible price from the captor of this booty. But they treat Alfonso de Avila with inhumanity. He is a young man of noble family, but not rich. They keep him a prisoner in a foul dungeon, upon the sole pretext that to him were entrusted this jewel and the other treasures. They think that they can exact from him twenty thousand ducats if he wishes to ransom himself."

Cap. VI. "Cortes, by reason that the French pirate named Florinus, took his fleet with many precious things, which he and the other officers in New Spain, partners in his conquests, were sending to Cæsar, has from grief over so great a loss, sent no letters either to Cæsar or to our Council. He has thus allowed a suspicion to arise from this and from the sayings of many who frequently return from those Kingdoms, of a defection from Cæsar."

Dec. VIII, Cap. IX [writing about a large fleet bound to the West Indies, on which there went a retainer of his, Juan Mendeguren, he says, November, 1525], "From him I have received letters from Gomera, one of the Fortunate Islands, where all vessels crossing the Ocean stop for refreshments. He writes that they had got thus far prospering, in the space of ten days, and that fast ships could do it in less, but that it was the duty of the convoy to wait for the slow sailers, lest they should fall into the jaws of the French pirates, who watched them for some time

under sail, that they might fall upon the laggards. I do not remember whether I have said or not, that two ships sent by Fernando Cortes from New Spain, the latest new lands known to us, had arrived at the Azores. I will tell you how it was arranged that they should not fall into the wide spread jaws of the pirates, who had long waited for them cruising around, and how they avoided them and what they bring. One of them, having discharged her cargo, determined to try her luck, and by the help of Providence, did not fall among the robbers, escaping safely. This news being heard, a fleet of six ships was hastily prepared, of which four are two hundred tons burthen, and also two caravels completely equipped for fighting, in case they met with pirates. The King of Portugal added four others, good sailers and well furnished with all kinds of guns. They sailed on the 25th of June, took in the cargoes left behind, and returned safely about the end of July. Thanks were offered to God in Seville. We expect the chief captains every day. There were only two small ships from Cortes. They ascribe the little treasure in the ships to the poverty of those regions. They bring to Cæsar only seventy thousand gold pesos." [He gives the reasons for ordering the spice laden vessels from the East Indies to start and to land at Corunna, among which is the fear of pirates along the Southern coasts, for, as he says], "there are in those shores between the high mountains many desert valleys, which are not much peopled on account of their sterility. These are the hiding places of pirates, who signalled by their men watching on the top of the mountains, attack the passing ships. On this account it was ordered that business should be carried on there" (at Corunna).

This Chapter is dated November 19th, 1525.

Martyr completed one more Chapter of this eighth Decade and died in October, 1526. There is some confusion in his accounts as given in the Decades, and they must be compared with his Letters in order to understand them. It will be noticed that in the Decades he only names Florinus once and that he says nothing about his capture.

XII.—LETTERS OF PETER MARTYR.

The letters of Peter Martyr cover a most interesting period of European history, namely, from 1488 to 1525. They are full of details which can be found nowhere else, and abound with gossip of all kinds. He wrote them in fluent but not very classic Latin, to persons in Italy or Spain, and often in haste, as he himself admits. We find in them many passages concerning the New World, taking, as he did, a vivid interest in the progressive discoveries made there. As a member of the Council of the Indies and as an attaché to the royal court he had opportunities of learning all that was happening there. He gathered these details into Decades, the first one, written before 1500, being published in 1511, two others appearing in 1516, and the whole eight in 1530, after his death, which occurred in 1526.

The letters, 812 in number, were first published at Alcala in 1530, and again at Paris in 1670, but have not been translated.

In Ep. 634 (Paris Ed.), dated January 30th, 1519, he mentions treasures expected to arrive from islands near the Continent. This was the consignment of gold collected by Juan de Grijalva during his expedition to Yucatan and the lower Mexican coast in 1518. This was forwarded by Velasquez, Governor of Cuba, and got safely in to Seville.

In Ep. 650 (Paris Ed.), dated December 2d, 1519, he announces the arrival of the first treasure sent by Cortes.

In Ep. 686 (Paris Ed.), dated September 13th, 1520, he says that all Gold from the Indies must pass through the Casa de Contratacion, and in Ep. 715 (same ed.), of March 6th, 1521, he alludes to treasure expected, as he says, from the lands West of Cuba. Verrazano, a few weeks after this last date, took one or two vessels from the Indies according to Herrera, but they were not sent by Cortes.

The next four letters are full of details concerning the pirates and their captures.

Epist. 774 (Ed. 1530), 771 (Ed. 1670).

Valladolid, November 19, 1522.

"These vessels from Fernand Cortes the conqueror of the Yucatan and other newest lands, have arrived at the Cassi-

terides, Portuguese Islands, commonly called the Azores. Concerning the treasures thereof, but particularly the ornaments and vestments consecrated to their deities, and how far they differ from those sent by the same, and which you saw in Valladolid, they speak with great animation and say that those brought in one of the three ships exceed the former greatly in beauty and value.

The other two vessels, however, fearing the French corsairs, have remained at the said islands. They pretend to say that cargoes to the value of eight hundred thousand ducats are brought in them. There they will stay, consequently, until another fleet, which has been ordered to be fitted out, can be sent from Seville to convoy them, for we have been taught by a very bitter example, which ought to make us more vigilant, unless fortune blinds us.

For last year one Florin, a French pirate, captured a ship coming from Hispaniola with gold to the amount of eighty thousand ducats, six hundred eight ounce pounds of pearls and two thousand arrobas of sugar. As Commander of these three vessels came Juan Ribera, as private envoy of Fernan Cortes, who in the name of his Master, Fernan Cortes, is to present half of those gifts to Cæsar, and the other half is to be offered by the two representatives of the magistrates and soldiers of those lands in their name to Cæsar. These two are still with the ships.

Juan Ribera resolved to tempt fortune with one of the ships and came in. What he brought you shall learn elsewhere. He has not yet landed the cases he brought, which, however, are all his own, nothing for the King himself.

In the three ships they brought over three tigers, reared from whelps, each in his cage. By the violence of the storms, one of the cages was opened a little one night. By great exertion the tiger burst the planks asunder and attacked the men as fiercely as if it had never seen one. Five of those it met were badly wounded (each) by one blow. Their comrades, roused by the noise, disabled the quadruped with spears and drove it into the sea. To avoid the same happening again they shot the second one in its cage with darts. So they only bring one, which God grant may, with the other things, escape the jaws of the pirates, for they have become so greatly allured by that booty, by means

of which they have gathered fresh strength, that we can no longer safely navigate our ocean."

Epistle 782 (Ed. 1530), 779 (Ed. 1670).

Valladolid, June 11, 1523.

"This very day more bad news is brought. I have already written about three ships which Fernan Cortes sent with immense treasures from the most remote lands, two of which for fear of pirates stayed at the Cassiterides, the Azore islands, until a new fleet could be sent to convoy them. A little fleet of three caravels was sent for their protection, but in vain. The larger vessel laden with those precious things, attacked by two ships, fell into the hands of John Florin, the French pirate. The other ship escaped, with only one of the twelve large cases, and one of the tigers of which I have already spoken. These few thus escaped, immensely excel in richness and elegance of the dresses, the gifts seen by you, before the Emperor's departure from Valladolid to Galicia on his way to the Low Countries. And no wonder. Those came from tribes in the provinces, these were brought from the treasury of that great King Muteczuma, and the other grandees of his court and their famous temples. Those who had handled the articles aver that those lost by this mischance exceed in value 600,000 ducats. There was a large quantity of gold dust, and the robes dedicated to their Gods were richly trimmed with gold. I took the Venetian Ambassador* and several nobles to see them at the house of those who are taking care of this box, until it is presented to Cæsar. These enable us to judge of what was lost. They admired the beauty and richness, the designs wrought with wondrous skill, and figures intermingled with all kinds of flowers, plants, animals, snares and birds. They are a strong proof that these people are polished, of acute minds and industrious."

Ep. 804, Ed. 1530.

Ep. 800, Ed. 1670.

Valladolid, August 3d, 1524.

"To turn to other matters; a courier of the King of Portugal comes hither with the complaint, that Florinus the French pirate had captured a ship of his King, coming from the Indies, in

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* See *Contarini.*

which the freight they brought was taken, amounting to a sum of one hundred and eighty thousand ducats of gums and spices."

Ep. 806, Ed. 1530.

Ep. 802, Ed. 1670.

Valladolid, November 18th, 1524.

"The sea is also hostile to us. Of the many carracks wrecked and damaged by storms you know most fully, for they were all Italian. Jacob de Veer, distinguished in Spain in your day, built one.

This fell into the hands of the French pirate, with a thousand five hundred bags of Spanish wool, and with other things which were going to the fairs of Belgium and Antwerp, amounting in value to seventy thousand ducats.

XIII.—CONTARINI ON THE FRENCH CORSAIRS.

The Venetian envoy in Spain, at this time, was the well-known Gaspar Contarini, and we find several allusions in his despatches home to the captures by the French corsairs. These papers are now in the Marciana (library) in Venice, bequeathed to it by one of his descendants, in 1843. Mr. Rawdon Brown, the able editor of several volumes of Calendars of Venetian State papers, relating to English affairs, pointed out these letters to Mr. Henri Harrisse, author of the Biblioteca Americana Vetustissima, 1866, and of other works showing great research. We give such extracts from them as bear upon the treasure of Cortes, from his Supplement to the work just mentioned, Paris, 1872.

The first extract, not dated, speaks of the new empire discovered by Cortes.

The second, from *Carte* 27, dated November 18, 1522 (one day previous to a similar one of Martyr's, both written after the arrival of Juan de Ribera), mentions the treasure, but says nothing about corsairs.

The third extract, from *Carte* 29, dated June 7, 1523, announces the capture of two out of three treasure-vessels by French vessels, and the escape of the third. He then adds: "His Majesty, here, has written to all his ports that as many as

possible should go out and pursue the said French vessels, and desires that half of the gold and vestments which may be recaptured should remain to them; for they hold that these French vessels cannot have yet reached a place of safety."

The other extracts are not dated, and speak of still richer treasures expected, etc.

XIV.—HERRERA'S DECADES.

Decade III, Lib. IV, Cap. XX, 1523. Alonzo Davila, Antonio de Quinones, Diego de Ordaz and Alonzo de Mendoza were waiting at Santa Maria, in the Azores, to be sent for, and, becoming tired of waiting, Diego de Ordaz resolved to come on with other passengers, in a Portuguese ship, and landed in Lisbon. Capt. Domingo Alonzo left the vessels bound to the Indies, that he was convoying, at the Canaries, and went to the Azores with his three caravels. Coming back to Spain with Davila, Quinones and their fellow passengers, with the gold and things they were in charge of, at ten leagues from Cape Saint Vincent, six armed French vessels came out against them,* whose captain was Florin of Rochelle. Of the three Spanish caravels, one took to flight, two prepared for battle, and, although they fought bravely, were captured. Antonio de Quinones was killed, and Alonzo Davila was carried to La Rochelle, whence those vessels came, and was a prisoner there for three years. Almost all the treasure was lost, which Cortez was sending to the King, not only as a present, but also his fifth, and a vessel, which was coming from Espanola, with sixty-two thousand ducats, six hundred marks of pearls, and two thousand arrobas of sugar.

Cap. XXI. The Emperor felt deeply the loss of the two caravels which the French captured, and of the ship, and with so much the more care he ordered that care should be had to protect the Armada by a fleet fitted out by expending the custom duties (averias).

Lib. VII, Cap. IV. (The Emperor) sent instructions to all the Governors of the Islands and Tierra Firme to assure the safety

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*This is probably an exaggeration; Florin had, probably, four only.

of the inward and outward voyage, and directing them what course to follow to avoid the corsairs.

Dec. III, Lib. X, Cap. XI, 1526. And as the French were still continuing to cruise (as corsairs), it was ordered that all vessels from the Indies should be well armed, and that they should gather at the Island of Hispaniola, and should sail together for mutual protection, for it was reported that the corsairs had captured a ship and taken from it the pilot and compass [chart?] in order to learn the navigation and help to look for the ships of the Indies, where they might be taken with greater safety to themselves.

The same arrangement was made for vessels sailing to the Indies, and that a Captain-General should have authority over the fleet, who, with experienced pilots, might save much loss, punish the mutineers, and repress the bad practice of the crews, who maltreated passengers and committed offences in the places where they stopped.

Revised maps were to be prepared under the supervision of Hernando Colon, etc.

A magazine of artillery and ammunition was also ordered to be established in Seville for arming the India-bound vesels.

XV.—BERNAL DIAZ DEL CASTILLO.

Cap. CLIX (CLXIX), fols. 163 and 164. Let us leave the letters and speak of the good voyage which our Procuradores pursued after they started from the port of Vera Cruz, which was on the twentieth day of the month of December [?], one thousand five hundred and twenty-two,* and they happily passed through the channel of Bahama,† and, on the way, two of the tigers out of the three which they carried escaped and wounded some sailors, and they determined to kill the remaining

* This date appears only in Bernal Diaz, and is certainly erroneous.

† The vessels were piloted by Anton de Alaminos, the discoverer of this channel, who accompanied Cortes to Mexico, and took his first vessel to Spain by this route. See B. Diaz, Cap. LIII; also note, *Gulf of Mexico*, to this paper.

one, because he was very wild and they could not manage him,* and continued their voyage to the island called la Tercera; and as Antonio de Quinones was captain, and considered himself valiant and in love, it appeared that he was returning to that island with a woman, and a quarrel arose about her, and they gave him a sword cut on the head, of which he died after some days, and Alonzo de Avila remained sole commander; and while Alonzo de Avila was steering, with the two ships, towards Spain,† not far from the island, Juan Florin, a French corsair, fought with them, and he took all the gold and ships, and Alonzo de Avila, and took the prize to France. And, in the same manner, Juan Florentin pillaged another ship coming from the Island of St. Domingo, and took from it twenty thousand pesos of gold and a great quantity of pearls and sugar and ox hides, and, with all this, he returned to France very rich, and made great presents to his King, and to the Admiral of France, of the articles and pieces of gold which we brought from New Spain, so that all France was marvelling at the riches which we sent to our great Emperor, and the desire took the said King of France also to own a part of the Islands of New Spain, and he said, at the time, that with the gold only that was going to our Cæsar from those lands he could wage war with his France, and although at that time Peru was not known or conquered, but, as I said, he only had that from New Spain, and the Islands of St. Domingo and St. Juan and Cuba and Jamaica, and it is told that afterwards the King of France said, or sent a message, to our great Emperor that as he and the King of Portugal had divided the world without giving him a portion of it, that they should show to him the testament of father Adam, whether they were named as his sole heirs, and lords of those lands which they had taken between the two without giving him any of them, and that for that

* Herrera, Dec. III, Lib. III, Cap. I, says there were two, and that the one which escaped wounded eight men and killed two. These animals were American jaguars.

† Bernal Diaz is the only authority for this scandalous tale, which may be only soldiers' gossip. Herrera, better informed, says Quinones was killed in the action with the corsairs. Diaz omits all reference to Juan de Ribera, the secretary of Cortes, who, according to Peter Martyr, was the chief of the deputation.

reason it was lawful to rob and take all that he could on the sea; and forthwith he ordered Juan Florin that he should return with another fleet to seek his living by the sea; and on that voyage which he undertook, and on which he made another great prize of all cargoes between Castile and Canary Islands, he met with three or four strong ships manned by Biscayans, and some of them attacking him on one side and the rest on the other, they fought with Juan Florin and destroyed and disabled him, and captured him and many other Frenchmen, and took their ships and clothing, and carried Juan Florin and other captains prisoners to Seville to the Casa de Contratacion, and despatched them prisoners to his Majesty; and after he knew it, he ordered that, on the way, they should be executed, and in the Puerto del Pico they were hung, and thus made our gold safe, together with the captains who carried it, and Juan Florin who took it. Now let us return to our story, which is that they took Alonzo de Avila prisoner, and they put him into a fortress, believing that they would get a great ransom, because he carried so much gold in his charge—guarding it well—and Alonzo de Avila, &c., &c.

XVI.—OVIEDO ON THE CAPTURE OF 1523.

Lib. XXXIII, Cap. XLI, Ed. Acad. Madrid, 1853, Vol. 3, p. 467–8.

This historian does not name Florin, although he mentions the loss of the vessels. After speaking of the despatch of the treasure and curiosities, he adds:

"They were taken at sea by French corsairs, and many who I have heard speak of this, and who saw those things, estimated their value at more than one hundred and fifty thousand ducats of gold, and that of the money which they took besides, or rather the gold and silver, at as much more. And although he [Cortes] regretted what had happened, he said that on the other hand he was pleased that they had taken them, because they would not be missed by His Majesty, as he would labor to send others much richer and more curious, according to the news received from certain provinces, which he had then sent to conquer. And that he was also satisfied with such a loss, because the French and other nations to whom these things became known, would know that besides the great and extensive kingdoms and

seignoralties which Their Majesties held in Spain and elsewhere, one of the least of their vassals could perform such a service in so remote a region as these Indies, gaining so many kingdoms for the increase of the royal sceptre of Castille."

Oviedo arrived in Spain from Espanola November 5, 1523, and was with the Court during 1524 and 1525, starting again for America April 30, 1526. If, therefore, Florin had been taken or hung during that time, Oviedo would certainly have chronicled the fact.

XVII.—GOMARA ON FLORIN.

La Conquista de Mexico, Çaragoça, 1553, fol. lxxxvii.

After describing the things sent in the three caravels from Mexico, and giving the names of the officers in charge of their precious freight, all which seems to be taken from Martyr's Decades, he continues:

"But Florin, a French Corsair, took the two caravels which carried the gold, this side of the Azores. And he took at the same time that which was coming from the Islands with seventy-two thousand ducats, six hundred marks of mother of pearl (aljofar) and pearls, and two thousand arrobas of sugar."

Francisco Lopez de Gomara became the Chaplain of Cortes after the conquest, and is generally considered a most reliable though sometimes partial historian. He may have been in Seville, a young man, at the time of Florin's capture of the treasure, and is the first author, after Martyr, who mentions Florin's name. That he, like Martyr, should be silent about the taking and hanging of Florin, is significant of the groundlessness of the story.

XVIII.—DE BARCIA ON JUAN VERRAZANO.

Ensayo Cronologico para la Historia General de la Florida: por Don Gabriel de Cardenas y Cano. Madrid, 1723, folio.

This is one of the numerous works of the indefatigable Don Andres Gonzales de Barcia, whose name is concealed under the above anagram of it.

Fol. 8, year 1524. "Juan Verrazano, a Corsair of France, coasted the Eastern shores of Florida for more than 700 leagues. Having sailed on the 17th of January from the uninhabited rock of Madera, he arrived at the mouth of the river of Canada or St. Lawrence, noting the lands, its people and their customs, as he himself writes* to Francis the First, King of France, from Dieppe, on the 8th of June [July], whose narrative is abridged by Antonio de Herrera, who believed that he returned to France, although some say that he did not, having died on the way; and others that on attempting to land he was eaten by Indians the following year. If he did not return to Florida afterwards, it would not be easy to agree about it. The truth is, that at that time, there infested our Seas Juan Florentin, a French pirate, who made himself famous from having taken, in the year 1521, the Ship in which Hernan Cortes was sending to the Emperor Charles V, a present of gold, silver and other precious things, in the charge of Alonzo de Avila, whom he took a prisoner,† and another ship coming to Spain from the Island of Santo Domingo, of great value, with which, and others, he returned to France very rich, and made great presents to the King Francis, and to those of his court, who was astonished to see such riches."

"He took again to the sea, much honored and favored, and with greater forces and preparations; did great damage, and took innumerable prizes; and retiring to France with them, he was met near the Canaries this year by four Biscayan vessels, who took his ships and what they carried, carrying him a prisoner to Seville, with others. Thence they were sent to Madrid, but those who had influence and had been damaged through his violence, clamored for justice: so he and the other Captains were executed, being hung in the Puerto del Pico as pirates, public enemies of nations."

Barcia erroneously places the first capture in 1521. We have shown that Florentin took a Santo Domingo ship in this year,

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* The Spanish reads, "como se dice, que el mismo lo escrivio a Francisco, &c.;" but he cannot mean to say that he was not acquainted with the letter itself in Ramusius.

† Who (Avila) having recovered his liberty went afterwards with Francisco Montejo to the conquest of Yucatan as Royal Treasurer, keeping the rank he held in New Spain. (Parenthesis in text.)

but the Cortes treasures, with another West India vessel, were taken in 1523. In 1522 he was driven away from the Canaries, according to Viera, and also from the Spanish coast, according to Herrera,* without carrying off any prizes. The conflict with the Biscayans is the story told by Bernal Diaz. This is therefore a very confused account, and palpably incorrect as to dates. His story of the execution is evidently taken at second hand from Bernal Diaz, leaving but a slender hearsay report as a foundation for it. As before stated, these two writers alone mention the execution of Juan Florin.

It will be noticed also that he makes him sail along our coast from north to south.

XIX.—DE VIERA.

Notices of the general History of the Canary Islands, by Don Joseph de Viera y Clavijo. Madrid, 1772. 3 vols. sq. 8vo.

Vol. II, Cap. XII, p. 294 (Castillo MS., lib. 3).

Action of the Governor of Canary, Pedro Suarez de Castilla, &c. (abridged).

"In the sixth year of his government, which was in 1522, he sent out vessels to recapture seven boats with emigrants for the Islands, and made Juan Florin, the corsair, release them.

"He then betook himself to the Azores, and captured two vessels returning from America, sent by Cortes, with the Ransom of Montezuma, with over 88m. Castellanos in bars of gold and plate, precious stones, pearls," &c.

There are two Castillo manuscripts mentioned by de Viera, in his Prologo. The above extract is probably from the one by Don Pedro Agustin del Castillo of Tenerife, being a history of the Islands. It would be interesting to look at this manuscript carefully, as it may contain further details about the above occurrence.

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* Dec. III, Lib. I, Cap. XIV.

XX.—CORTES DE VALLADOLID.

Las Cortes de Valladolid del ano do 1523.

Printed 1551.

Peticion LXXIII.

"Item that the seas of the Kingdom of Granada and Andalusia, and also those of Castille, being full of Moorish, Turkish and French corsairs; so that no one can traffic, and every day they attack the forts and capture persons and effects, and also other damage, therefore your Highness is begged that the fleet may cruise in said seas, and that another fleet may be prepared, if necessary, so that the seas may be cleared in such a manner that commerce can be carried on, that the galleys may be equipped and entrusted to a person of experience and accustomed to maritime matters, and that your Highness would provide in such a way that these Kingdoms may not suffer such damage, disgrace and affront that no one dare leave his house, and merchants dare not come to Castille, from fear of the corsairs, and from this reason the goods that are brought and enter the Kingdom are twice as costly as they used to be.

To this we answer, that we appreciate what you tell us, and it is right that measures should be taken, and we charge you to arrange among yourselves the manner and method which is to be followed to remedy it, and advise us thereof; because what can be provided according to our means shall be done, and in the providing of the galleys we have already entrusted them to a person experienced in the sea."

Peticion LXXII.

"Further; that a guard of the coast of Granada be provided, as it was in the time of the Catholic Kings.

To this we answer, that it shall be done."

This is probably the petition alluded to by Peter Martyr, as having been presented by the Council of the Indies, in Decade VII, Cap. IV. It is, however, uncertain whether the sending of an armed fleet under Domingo Alonzo to the Azores, was an independent act of the Council of the Indies, or in accordance with this decree.

XXI.—CORTES DE TOLEDO.

Las Cortes de Toledo del ano de 1525.

Printed 1550.

Peticion XXII.

"Also we entreat your Majesty that since all the Kingdom and the coasts of Castile, as well as those of Andalusia, are much cursed (damnificada) by the robberies which the French and Moors have committed, and continued to do daily, of many ships and merchandise of great value, and of the gold from the Indies, which they have taken because our coasts are not guarded; by which your Majesty is much injured, because the French provide themselves with our ships, and the Moors take them also, and with them carry on war, and the coasts will remain without shipping, from which great damage will ensue to the whole Kingdom, may your Majesty be pleased to order that in the Cities and places in the land of Biscay and of Guypuscoa those who may wish to do so may arm, your Majesty ordering and aiding them to do this, and further providing thus for the sea coast as may be required; and also in the ports of Andalusia and the Moorish coast, may your Majesty order this to be remedied and provided for; in such manner that the French and the Moors may not do mischief as they have done hitherto; all which your Majesty has promised many times for the peace of your Royal mind and for the honor and profit of these Kingdoms; and towards this his Holiness has granted and grants many Bulls and Indulgences.

To this we answer that we hold it a service for all those of our Kingdoms who desire it to arm for the above purpose; and to aid in the outlay they may make, we have ordered and now order that during our Royal reign the fifth belonging to us in all prizes taken shall be granted; in furtherance of which we order our Council to make the required regulations; and as for the coast-guard, we have ordered our Council of War to issue orders, to provide that the coast be made safe and well watched, that our subjects may not suffer loss."

This decree was perhaps issued in 1523 or 4, after the great captures of the Mexican treasure vessels, and the Biscayans, who met and captured a fleet of French Corsairs, probably fitted out under its authority.

XXII.—CORSAIRS IN THE WEST INDIES AFTER 1527.

Continual complaints of the ravages by French and English corsairs were made by the officials in the West Indies after the year 1527. The thirst of the Spanish monarchs for gold, and the rapacity of individual adventurers, left the colonies poor, and productive of little besides articles of intrinsic value. So little had been expended for the defence of these rich islands and provinces, that as late as 1535 there had been constructed but one fort for their defence,* the poor one in the port of Sto. Domingo, of which the historian Oviedo was alcalde from 1533 to 1554. His complaints of its poor condition, with its ten soldiers, a few small cannon and small supply of powder, were unceasing. This fort, and some minor defences at other points, are said to have been constructed for defence against the Indians only, and not as a protection to the ports.

The only naval armament consisted, in 1541, of galleys at a few ports,† and the sea was quite open to any daring foreign adventurer. This defenceless condition became known to the French and English, who soon took advantage of it, and their privateers roamed in the Gulf and Caribbean Sea, entering ports and seizing laden vessels in them, sacking towns or levying ransom, and refitting in places which dared not refuse supplies.

Some of the English vessels had French pilots, who were better acquainted with the routes to the islands and the coasts there than their own, the French having been the first to inaugurate privateering at the sources of the supply of precious metals.

From this time the pursuit of Spanish treasure became unceasing, and was continued for a century and a half by the French or English, the Dutch also entering the lists after shaking off the Spanish yoke. The history of the early buccaneers has not been written, but many tales of the exploits of their successors have been gathered. Spain paid dearly for her colonial policy of exclusion, and reaped no lasting benefit from her possessions in the New World.

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* Doc. In., 1864, 581.

† See in reference to the above: Oviedo, Herrera, and Documentos Ineditos, particularly the volume for 1864, pages 12, 15, 511–13–48–70–72–75–81–83.

XXIII.—ROUTES TO AND FROM THE WEST INDIES.

No settled route from Spain to the West Indies had been pursued until Pedrarias Davila, in 1514, going to Castilla del Oro (Darien), with a fleet, took advantage of all that could shorten the navigation, and his path across the ocean was thenceforth adopted as the regular one to be followed. Oviedo, Herrera, Cespedes and others describe the route outward and inward circumstantially.

The first course outward from Spain was to Gran Canaria, Gomera or Palma, occupying eight or ten days, where supplies were taken in. Taking a departure from Ferro, a course was made W. S. W., ¼ S., toward the Northerly windward Islands, favored by the Brisas or trades, endeavoring to sight La Deseada and Dominica. This course, occupying about twenty-five days, was estimated at 750 leagues. On a great circle, it measures 721 Spanish leagues, or 2,470 nautical miles. Vessels badly steered would go wide of the mark, and first make the leeward islands, or even the coasts of Honduras. From Dominica they would generally make for the city of Santo Domingo, on the south side of Hispaniola, unless bound for Tierra Firme. The whole voyage was made in about thirty-five to forty days, and the vessels bound to the Northerly Islands would sail in April or May, but if for Tierra Firme, in August or September.

The return voyage was made in a higher latitude, in order to avoid the trades and meet the north-west winds. At first, vessels passed out into the ocean through the old Bahama channel, but after the Florida channel had been discovered by Alaminos, and the corsairs became troublesome, they were ordered to rendezvous at Havannah, and sail in fleets for mutual protection. Thence they kept well to the north, sometimes sighting the Bermudas, and generally stopping at the Azores. If the Azores could not be made, a course was made to Cape Blanco. From either of these points the course was taken toward Cape St. Vincent, in Portugal. In the winter season the lower course, in lat. 33 deg., was preferred. Twenty or thirty days was the average time of the voyage to the Azores, and fifteen or twenty thence to San Lucar, though much better time was sometimes made, while others were

three or four months on the way. The start from New Mexico, or Havannah, was generally made early in May.

We give the above in order to indicate the stations which the corsairs would most likely select to waylay Spanish vessels, and the seasons at which they might expect them. About 1527, the French and English corsairs found that by following the trades to the West Indies, they could better attack the treasure-laden vessels of the Spaniards before they had gathered at their rendezvous in Cuba. The precautions taken to guard them after they had thus met together almost put an end to the watch of the corsairs around the Azores and Cape St. Vincent, which had proved so profitable to Verrazano.

XXIV.—SUPPRESSION OF GEOGRAPHICAL KNOWLEDGE BY SPAIN.

The jealous secretiveness of Spain regarding her marine charts has been noticed in another note, and therefore the appearance of a chart of the West Indies in Martyr's Decade of the Ocean, in 1511, must have been unauthorized and probably distasteful to the government. Curiously enough, the King, in this very year, forbids the communication of Spanish charts to foreigners, and it may be that this measure was dictated by the publication of this chart as much as by the Portuguese attempt to get maps from Vespucius. Possibly this may have led to a suppression of the book, for but very few copies of it are now known. The next editions, of 1516 and 1530 (this last, the fullest one, and published after his death) have no maps at all.

No maps by Columbus or by the Spanish explorers of America were ever published. We have none by Cortes or Pizarro, Magellan or Gomez, but they all prepared draughts of their discoveries, no doubt, that served the *Pilotos Majores* in the compilation of the fine manuscript charts preserved in European libraries. In fact, we find many references to such charts, but very few of them are now known.

No official general charts of the Americas were published in Spain until 1790, but several sketches, such as Pedro de Medina's

of 1545, appeared in Spanish works after the middle of the sixteenth century. The first general map of the new continent, published from Spanish authorities, is that by Sebastian Cabot in his Mapamundi of 1544, of which but one copy, found by the late Von Martius of Munich, and sent to the Royal library in Paris, in 1843, is now known. Cespedes, in 1606, speaks of it as having been presented to the King of Spain. Its rarity can only be explained by the desire to suppress it by Spanish authority; and the loss of Cabot's papers and memoirs after his death, in 1556, was, no doubt, the result of the same jealous desire to suppress a general knowledge of the Spanish colonial empire. The attempts made to represent the New World by Hylacomilus, in 1513, by Schöner and Apianus, in 1520, and Gemma Frisius, in 1525, were mere guesses at the real outlines of America, until the general interest taken in the Spanish discoveries after the conquest of Mexico, and the wonderful voyage of Magellan, brought out the tolerably accurate map of Oronce Finé, of Dauphiné in 1531. Severe penalties were threatened, and death was to be the punishment of those who allowed strangers to get copies of Spanish charts. These charts, however, must have fallen, at times, into the hands of foreigners, and our navigator, no doubt, had found several such in his prizes, and thus the routes to the Indies became known to the English and French. Spanish pilots may have entered foreign service, but if so they probably assumed an *alias*, and but one such is named up to the year 1530.

XXV.—FAMILY OF VERRAZANO.

Two Eulogies of Giovanni de Verrazano appeared in Florence about the same time. One, which we have not seen, was included by Giuseppe Allegrini, a printer in Florence, in the second Volume of the work entitled *Ritratti ed Elogi degli Uomini Illustre della Toscana*, 1768. The other was prepared by Giuseppe Pelli for the same work, but was for some reason, not accepted, and was printed separately by the author, with a preface mentioning the above facts, in 1769. It is signed G. P., but we learn the name of the author from Tiraboschi. Pelli also published

Memoirs for the life of Dante, a work of some value, and which was republished in 1823.

The notice of Verrazano is entitled *Elogio* | *di Giovanni da Verrazano* | *Fiorentino* | *Scopritore della Nuova Francia nel Secolo XVI.* | [Colophon.] *In Firenze* MDCCLXIX. | *Nella Stamperia di Giuseppe Allegrini, e Comp.* | Square octavo, pp. xi.

The copy we have consulted, perhaps the only one in this country, was purchased at the Kirkup sale, London, December, 1871, and was kindly loaned to us by the Hon. Henry C. Murphy.

The family of Verrazano is considered by Pelli, to have come from Verrazan,* a place in the Val di Grève, a few miles South of Florence (which in the twelfth century belonged to the De Bertoldis e da Panzano), and at the time of his writing still held property there. The same writer says that the Gonfalonierate was twice held by members of the family, and the Priorate about forty times. He names Ludovico di Francesco di Baccio da Verrazano, as having distinguished himself when Governor of Leghorn and Commander of the galleys of San Stefano.

His eulogist states that his parents' names were Piero Andrea di Bernardo [di Bernardo] da Verrazano, and Fiametta Capella. Giovanni was certainly born after 1480, and had a brother, who was of the Priori in 1529, (possibly the Hieronimus who made the chart, now preserved in Rome, which Mons. Thomassy has described.)

The biographer adds that he had seen, in the possession of the family, a copy of Ramusius with a MS. treatise on navigation added to the letter, which was no doubt a copy of the one seen in the Magliabechian Library, by Mr. Greene in 1837, and given in Vol. I of the Proceedings of the New York Historical Society, New Series, 1841. Besides the above, Pelli gives some

* There is a place, whose modern name is very like that of our navigator's, viz., *Verraza*, the ancient *Voragina* or *Varagio*, a few miles west of Cogoletto, one of the places which claims to be the birthplace of Columbus. Verraza is on the *Riviera de Ponente*, some eighteen miles west of Genoa, a place where much shipbuilding is done, and the birthplace of Jacopo di Voragine, a Dominican, Archbishop of Genoa in 1292, and the compiler of the curious collection of stories known as the Golden Legend.

other details, not immediately relating to our Navigator, and notices in a brief manner the voyage of 1524, from the text of Ramusius, without a suspicion that a copy of perhaps the original letter was preserved close at hand, in the city where he was writing.

No doubt the family history could be traced with greater certainty by a modern Italian scholar, versed in such studies. We can add one or two names to the family, that may assist investigators. A fine Manuscript sermon, written in the neatest style of Italian script, signed at the end "*Alexander Verrazanus escripsit* MCCCCLXXXXIIII," was procured by us from the above mentioned sale of Baron Kirkup's library, lot No. 4035. This may have been an uncle of Giovanni's, who had taken holy orders.

We find the same Christian name mentioned in Coronelli's *Epitome Cosmographica*, published in Cologne in 1693. At page 263 we read, after a short notice of the voyage of 1524, "that one of the same family, named *Alessandro*, was living at that date in Florence."

In the letter of Annibale Caro, of October, 1537, the Verrazano who is addressed as a Mapmaker and traveller, and as having a brother also a navigator, was probably Hieronimus, author of the Mapamundi. Mr. Smith, however, in his Inquiry of 1864, treats this letter as a fiction and literary *jeu d'esprit*, but we are of a contrary opinion.

Mr. Greene says that the family became extinct in Florence by the death of the Cavaliere Andrea da Verrazano, who died there in 1819.

Since the above was written we have seen the work first mentioned and find that it adds nothing to what was already known, concerning our navigator, though some details may be gleaned from it not contained in Pelli's Eulogy. The work in which this Eulogy appears is entitled, "*Serie di Rittrati d' Uomini Illustri Toscani con gli Elogi istorici dei medesimi*," &c. [title engraved,] *Firenze, appresso Giuseppe Allegrini.* In four large imp. folio vols. with engraved portraits, &c. Many of these are engraved by Francesco Allegrini. The dates of the vols. are 1766–68–70 and 73. The Eulogy, with portrait of Verrazano, is under No. 30, in the second volume. It is signed A. C. N. and in the "*avver-*

timento," the author of it is not named, but is said to be a relative (*agnato*) of the jurist Antonio Maria Rosati. Pelli is here acknowledged to be the chief editor of the work. The present Eulogy, as before said, was substituted for the one he had prepared, in consequence of some unexplained misunderstanding.

The name is here spelt *Verrazzano*. On the authority of Cosimo della Rena, the family is said to be of Lombard origin, to have settled in the Val di Grève, and acquired citizenship in Florence in 1190. One of them in 1260 was a Guelf leader, another in 1428 was a general of the Duke of Milan, and Francesco, the Governor of Leghorn, is said to have been much honored by Philip the Fourth of Spain. His mother is farther identified as *Fiametta* (*di Barone, di Giovanni, di Filippo*) *Capelli*. With Pelli, the author assumes that he was not born before 1480, as his name is not found on certain Registers (*Catasto*) that close with that year.

This Eulogist then speaks of the voyage to America, from the letter as given in Ramusius, referring to Charlevoix, &c., but adding nothing to what we already know except that he draws attention to the manuscript copy of the letter, with its cosmographical appendix, in the Strozzi library. (Pelli saw this appendix in MS. in the family copy of Ramusius.) It was therefore from this reference that Tiraboschi was probably enabled to refer to this version of the letter in its first form, which Mr. Greene copied for the New York Historical Society, who published it in 1841.

In a closing note, the author speaks of a portrait of the navigator, hanging in the *Real Galleria Medicea*, in the Series of Illustrious Men, and as among the famous Seamen, under No. 37. He also mentions a medal struck in his honor, as described in the "*Tramoggia del Annale Secondo della Academia Colombaria*" under No. 139.

The Portrait accompanying this Eulogy is probably of very doubtful authenticity. It represents a good looking man in armor, with a *baton* in his right hand. Under the portrait there is a coat of arms, which if it really represents the bearings of the family, is curiously suggestive of nautical pursuits. It has a large eight pointed star, gules, with a small shield on the dexter chief bearing a double *fleur de lis*, all on a field party per pale, or and

argent. This seems to be an attempt at a marine compass, and recalls the arms of Amalfi, where that instrument is said to have been invented or improved by Flavio Gioja.

Under the Portrait is the following Inscription, *Giovanni di Pier Andrea di Bernardo da Verrazzano* | *Patrizio Fior^no gran capit^no comandante in mare per* | *il re cristianissimo Francesco primo,* | *e discopritore della Nuova Francia. nato circa il MCDLXXXV morto nel MDXXV.* | *Dedicato al merito sing^re dell Illmo, e Rev^mo Sig^re Lodovico da Verrazano* | *Patrizio, e Canonico Fiorentino Agnato del med^o* | *Preso dal Quadro Originale in Tela esisente presso la sud^a Nobil Famiglia.* | *G. Zocchi del: F. Allegrini inci:* 1767 |

XXVI.—CRIGNON, PARMENTIER, ESTANCELIN.

L. Estancelin published at Paris, in 1832, in 8°, his "*Recherches sur les Voyages et Déconvertes des Navigateurs Normands.* He was the fortunate discoverer, among the papers of Mons. Tarbé of Sens, of an account of the voyage of Jean Parmentier, of Dieppe, to Sumatra, in 1529, which was prefaced by a cosmographical treatise.

This last was given in Italian by Ramusius, in his collection, Vol. III, 1556, folios 423 to 431. Ramusius regrets not being able to give the name of the author of this "*Discorso,*" and had apparently not seen the second part, which is the Voyage to Sumatra in 1529.

The manuscript discovered by Estancelin, is considered by him to be of a contemporaneous hand. He gives it in full, adding the Italian part as found in Ramusius. The first part, however, alone interests us, as containing perhaps the first written evidence alluding to the voyage of Verrazano.

Mons. Margry, in his Navigations Françaises, etc., pages 130, 199, considers Pierre Crignon, the companion of Parmentier, to have been the author of the Discourse and Narrative. Parmentier, the commander of the expedition, died December 3, 1529, in Ceylon. There is no evidence that Crignon was the author of the *Discourse,* although he was a good navigator, and wrote a treatise on the variation of the magnetic needle.

This first part, or *Discorso* as Ramusius well calls it, though a very brief one, gives the author's ideas of the coasts, and of the distances along them, of the known world. It is written in a clear and sketchy manner, and we should like to dwell upon it in greater detail, but shall confine ourselves to the passage in which he alludes to Verrazano.

This discourse appears, from internal evidence (and is admitted by Mr. Margry), to have been written in 1539, and is interesting as presenting the first notice of the voyage of 1524, written by a person who perhaps had known its commander.

"*The land of Norumbega.* Following the direction of Cape Breton [from E. to W.], one meets with a land contiguous to this cape, and whose coast extends westwardly, one quarter south-west [W. by S.], to the lands of Florida, embracing a space of about five hundred leagues. [Our author had clearly not been along this coast himself.]

"This coast was discoverd, fifteen years since, by Messire Jean de Verrazano, who took possession of it in the name of the King, Francis the First, and of Madame, the *Régente.* Many navigators, and even the Portuguese, call it the Terre Française. It ends towards Florida, at the 78th degree of longitude West, and 30th degree of latitude North. The land is very fertile in all kinds of fruits; it grows orange trees, almond trees, wild grape-vines, and a great variety of odoriferous trees. This land is called *Nurumbega* by the natives."

About the name Nurumbega, here first mentioned, much has been written without any satisfactory derivation having been suggested, except that it seems to be a native name with the termination *eg* or *ek*, sometimes found farther south as *og*, *ok*, or *ogue*, which is an adverbial addition, meaning the *place where*, or the *place of*. It is also a common Breton or Norman termination to the name of many places, and thus perhaps its origin may be traced to the early fishing expeditions to these coasts, about which so little is known.

Another suggestion has been made, that the name may date back to the time of Ayllon, for Peter Martyr, in giving the details of the Licentiate's explorations, in the second book of his Seventh Decade of the New World, written in 1524, but not published till 1530, says, "*The Spaniards travelled through many of the great provinces of these little Kings, among which they named Arambe, Guacaia, Quohathe, Tanzacca, Pahor, all the natives of which are dusky.*" As no such name as Arambe or Arambec

appears on he Spanish maps of 1527 and 1529 by Colon and Ribero, which were made up from the very reports of Ayllon and Gomez, and as Peter Martyr's work was probably unknown to the author of the Memoir of 1539, it seems that we have here a mere verbal coincidence. One might as well make Powhattan and Tennessee out of two of the other names.

On the copper globe of 1542, by Ulpianus, (preserved in the New York Historical Society), we find, in the position generally assigned to Norumbega, an attempted latinized form of it as *Normanvilla.* This seems to be its first appearance on a map.

The map of Hieronimus Verrazano shows, however, in the photographic copy of it before us, a trace of a name like Norumbega.

XXVII.—DESMARQUETS.

Jean Antoine Desmarquets, author of the *Memoires Chronologiques de Dieppe*, etc., Paris, 2 vols., 12°, 1785, (Vol. I, page 100,) gives to Thomas Aubert, on his voyage to Newfoundland in 1508, a companion named *Jean Verassen.* He pretends to have found this fact in the old archives of Dieppe, but from the tenor of a foot note on the subject, he does not consider this *Verassen* to be the same person as *Verrazano*, the Florentine.

He adds that in the year 1508 these two captains, in two vessels, ascended the St. Lawrence River for more than 80 leagues (240 geographical miles), naming it thus because they began to ascend it on that saint's day, the 10th of August.

This remarkable statement is entirely isolated, and has not since been verified and confirmed. As the archives of Dieppe were destroyed in the bombardment and conflagration of 1694, and the author of these memoirs had little else to consult but private records, his early history of Dieppe is not considered reliable. There is good evidence that Thomas Aubert did make such a voyage in that year, but the name of Verrassen is not elsewhere mentioned.

The evident desire of Desmarquets to lessen the merit of Jacques Cartier, of St. Malo, a rival seaport, as having discovered the St. Lawrence in 1534, has perhaps led him into putting faith

in some indications of such a previous discovery among the papers he consulted.

Estancelin, a Dieppese himself, and a close student of what is left of the early history of his native place (and whose family papers were used by Desmarquets, as that author states in his preface), found no such name as Verrassen associated with that of Aubert. Compare, op. cit., p. 43 and 222.

XXVIII.—RIBAULT.

Ribault, who sailed for Florida from Havre de Grace on the 18th of February (O. S.), 1562, but did not leave the coast near Brest till the end of February, determined to cross the ocean in a direct line, supposing that he was the first one to attempt it, forgetting or not knowing that Verrazano had done it before. (See Hak. Soc.; Div. Voy., edited by F. Winter Jones, pp. 95–98.) He says: "I determined to prove a newe course which hath not beene yet attempted, etc., to make the furthest arte and traverse of the seas, that ever was made in our memorie or knowledge, in longitude from the East to the West."

They sighted Florida on the last of April, having been delayed by storms, being, therefore, two months on the voyage, which is a fair run, considering the unfavorable season of the year, and the imperfect build of the vessels of those days.

Verrazano was fifty days on the voyage from Madeira to Florida.

XXIX.—TAVANNES' MEMOIRS, 1536.

There is to be found in the Memoirs of Gaspard de Saulx, Seigneur de Tavannes, of 1536, a curious passage* (which we translated for the Historical Magazine, Vol. VI, 1862, p. 157), in which the author dwells on the rise of prices, caused by the

* First privately printed; republished, 1657, and included in Petitot's collection, Tom. 23, Ser. I, p. 238.

influx of the precious metals from the new Indies, and the power conferred by gold on nations possessing it. He also anticipates the use of paper money by proposing the use of tokens of iron, coined "in such a way that it could not be imitated." He closes thus: "This conquest of the New World, proposed to the French and despised by them, is a proof of the little talent of their counsellors, who lost empires for their master, and let their enemies conquer them instead."

There seems always to have been a vague tradition relating to the object of the stay of Bartholomew Columbus at the French court about 1490,* and also of the undertaking of Verrazano, in 1524, circulating in France, but without positive evidence concerning the success of either.

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The general rise in the prices of all the necessaries of life after the conquest of Peru, became so noticeable that it attracted the attention of the government. One of the reasons to which this advance in values was attributed was the exportation of such articles to the Indies. This forms the subject of several petitions to the Emperor, in 1548, with the prayer that such exportation may be stopped. The emperor's answer to one of them, praying that woolen, cotton and silk goods may not be exported to the Indies, is that he has referred the matter to the Royal Council and to the Council of the Indies jointly, and that he will act on their advice. †

The result of this reference is not given, but such a prayer shows how little Spain understood the management of her colonies. As mere producers of the precious metals, the value of these fell as they became more plenty, and no one was the gainer by such a trade.

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in some indications of such a previous discovery among the papers he consulted.

Estancelin, a Dieppese himself, and a close student of what is left of the early history of his native place (and whose family papers were used by Desmarquets, as that author states in his preface), found no such name as Verrassen associated with that of Aubert. Compare, op. cit., p. 43 and 222.

XXVIII.—RIBAULT.

Ribault, who sailed for Florida from Havre de Grace on the 18th of February (O. S.), 1562, but did not leave the coast near Brest till the end of February, determined to cross the ocean in a direct line, supposing that he was the first one to attempt it, forgetting or not knowing that Verrazano had done it before. (See Hak. Soc.; Div. Voy., edited by F. Winter Jones, pp. 95–98.) He says: "I determined to prove a newe course which hath not beene yet attempted, etc., to make the furthest arte and traverse of the seas, that ever was made in our memorie or knowledge, in longitude from the East to the West."

They sighted Florida on the last of April, having been delayed by storms, being, therefore, two months on the voyage, which is a fair run, considering the unfavorable season of the year, and the imperfect build of the vessels of those days.

Verrazano was fifty days on the voyage from Madeira to Florida.

XXIX.—TAVANNES' MEMOIRS, 1536.

There is to be found in the Memoirs of Gaspard de Saulx, Seigneur de Tavannes, of 1536, a curious passage* (which we translated for the Historical Magazine, Vol. VI, 1862, p. 157), in which the author dwells on the rise of prices, caused by the

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XXX.—ANDRE THEVET, 1557.

Thevet does not, in his "*Singularitez de la France Antarctique*," 1557, allude to Verrazano's voyage. This work is generally supposed to have appeared in Paris and at Antwerp, 1558, but we have a copy with the imprint Paris, 1557. In his "*Cosmographie Universelle*," 1575, he speaks of him, but only from the published letter. Thevet, however, is a poor authority, for his statements are often false, and his omissions many. Jean de Lery does not hesitate to call him a superlatively impudent liar.

XXXI.—BELLEFOREST, 1570.

François de Belleforest, in his "*Histoire Universelle du Monde*," 1570, writing, book 4, about the New Lands, gives details, taken from Ramusius, concerning *Verrazan* (as he calls him), but in a marginal note, gives the correct name, *Loise*, to the island off the coast, which Verrazano said was named after the King's mother. It does not appear, however, that he had any map of the explorations before him, while he expressly adds that he had not met with any other account, in books, concerning the Florentine, except in his *Memoir*, meaning the letter to the King. He appears to have misunderstood Ramusius, for the death of Verrazano is noted by him as having occurred about the year 1524.

XXXII.—ITALIAN VERSIONS OF THE HEADING TO THE LETTER.

I. Extracted from Collections New York Historical Society, New Series, Vol. I, 1841, p. 55. Punctuated from Greene's quotation in North American Review, October, 1837, p. 294.

Il Capitano Giovanni da Verraznano, fiorentino di Normandia alla Serenissima corona di Francia dice:

Da poi la fortuna passata nelle spiagge settentrionale, Ser^mo^ Signore, non scrissi a vostra serenissima et cristianissima Maesta,

quello che era seguito delli quattro legni, che quella mandò per lo oceano ad inscoprir nuove terre, pensando di tutto sia stata certificata come dalle impetuose forze dé venti fummo constretti, con sola la nave Normanda e Dalfina affliti, ricorrere in brettagna, dove restaurati avrà V. S. M. inteso il discorso facemmo con quelle armate in guerra per li lidi di Spagna, di poi la nuova disposizione con sola la dalfina in seguire la prima navigazione, dalla quale essendo ritornato, darò adviso a V. S. M. di quello abbiamo trovato.

II. Extracted from Ramusius, Vol. III, 1556, fol. 420.

Non scrissi à V. Maestà CHRISTIANISS. RE dopo la fortuna havuta nelle parti Settentrionali, di quanto era delle quattro Navi seguito, da V. M. mandate à discoprire nuove terre per l'Oceano, credendo che di tal successo convenientemente la fosse stata informata. Hora per la presente le daro à quella notitia, come dall' impeto de venti con le due Navi, Normanda, & Delfina, fummo constretti cosi mal conditionate come si ritrovavano scorrere nella Bretagna. dove poi che furono secondo il bisogno racconciate, & ben armegiatte, per i liti di Spagna ce nandammo in corso. il che V. M. haverà inteso per il profitto che ne facemmo. Dipoi con la Delfina sola si fece deliberatione scoprir nuovi paesi, per non lasciar imperfetta la gia minciata navigatione: Il che intendo hora a Vostra Maestà raccontare, accioche di tutto il successo sia consapevole.

XXXIII.—COSMOGRAPHICAL PORTION OF THE LETTER.

[1.] It remains for me to narrate to your Majesty the order of the said navigation as regards cosmography. As above said, starting from the before mentioned rocks, which are placed on the bounds of the West as known to the ancients, and from the meridian drawn through the Fortunate Islands, in 32 degrees of latitude from the equator of our hemisphere, sailing to the West, unto the first land, we found 1,200 leagues, which contain 4,800 miles, counting four miles per league according to maritime usage,

[The following passages are obscure, and we have paraphrased them as we understand them.]

[2.] The proportion of the diameter to the circle, would make the above distance [illegible] degrees, in lat. 34 degrees, that of the land first discovered by us. The round or diameter of a great circle of 360 being [illegible], would make this [illegible] degrees at the equator, in degrees of [illegible] miles each, as fixed by many who have determined it. Thus we have [illegible] miles [in lat. 34°] which, divided by 360, makes each degree in lat. 34° equal to [illegible] miles. Besides this, we have reckoned that 1,200 leagues in a straight line from West to East, from the meridian of those rocks, which are in lat. 32° to lat. 34° would also give those [illegible] degrees, and thus much more have we sailed to the West than was known to the ancients.

[3.] This distance was noted by us as to longitude with various instruments, sailing without lunar eclipses or other observation for the movement of the sun. Seeking always the height [of the sun] at the time that was proper, the ship was run geometrically [the distance estimated], by the difference between the [midday] horizons, the interval from one meridian to the other being fully noted in a little book, together with the rise of the sea [current] in every climate at different times or hours, which, we think, will not prove useless to navigation. With the best wishes for [advancing] learning, I present it to your Majesty.

[4.] My intention was to reach [*pervenire*] by this navigation to Cathay, in the extreme east of Asia, expecting [however] to meet with new land such as was found as an obstacle, but I had reason to suppose that it was not hopeless to penetrate to the eastern ocean. This opinion was held by all the ancients, and it was positively believed as certain that our ocean was one and the same as the eastern one of India, without any interposition of land. Aristotle affirms this, arguing by various comparisons, which opinion is much opposed to the modern one, and by experience proved false, because land is already found, unknown to those ancients, another world as regards the one known to them. It appears really to show itself to be larger than our Europe, Africa, and even Asia, if we rightly judge of the size of it, as I will briefly show it in a short discourse to your Majesty.

[5.] The Spaniards have sailed on a meridian 20[illegible] degrees

West of the Fortunate Islands, towards the South, to 54 degrees [South] beyond the equator, where they found the land without a termination; then turning North to the equinoctial, following the shore to 8 degrees from the equator, then [the land ran] more to the West, inclining to the North [N. W.] as the said meridian runs, the shore continuing to 21 degrees [N. lat.], finding no end to it. They have sailed $89\frac{[illegible]}{[illegible]}$ degrees, which, added to the $20\frac{[illegible]}{[illegible]}$ [comp. ante], make $110\frac{[illegible]}{[illegible]}$ degrees, and so much they have sailed more to the West, from the said meridian of the Fortunate Islands, in the parallel of 21 degrees of latitude. This distance has not been verified by us, not having made this navigation. It may vary a little more or less. We have calculated it geometrically from the notices of many nautical men who are familiar with it, who affirm that it is 1,600 leagues, judging by the estimate of the run of the vessel according to the nature of the wind. In the succeeding voyage I hope that, in a short time, we shall have further proof. On the other hand, we in this our navigation made by your Majesty's order, besides the 92 degrees which we made from the said meridian towards the West, to the first land found in 34 degrees, sailed 300 leagues to the East and 400 leagues to the North, the shore of the land continuing to the East, until we reached 50 degrees.

[6.] We left the land which in past times was found by the Portuguese, which they followed farther to the north, reaching to the Arctic Circle, leaving its termination unknown. Therefore, putting the Northern with the Southern latitude, that is the 54 degrees with the 66 degrees, they make 120 degrees, which is more than is contained in the latitude of Africa and Europe. For measuring from the extreme of Europe, which are the limits of Norway standing in latitude 71 degrees [71° 12′], to the extreme of Africa, which is the Cape of Good Hope in latitude 35 degrees [34° 51′, both nearly correct], it only makes 106 degrees. If the breadth of the said land corresponds in proportion with its maritime front, there can be no doubt but that it exceeds the size of Asia. In such a shape we find the globe of the earth much larger than it was held to be by the ancients, contradicting the mathematicians in regard to the sea being smaller, for we have seen the contrary by our own experience, and as to its land area, this is, we judge, not less than that of the water. As things

[The following passages are obscure, and we have paraphrased them as we understand them]

[2.] The proportion $3\frac{1}{7}$ of the diameter to the circle, would make the above distance $92\frac{5464}{477733}$ degrees, in lat. 34 degrees, that of the land first discovered by us. The chord or diameter of a great circle [of 360] being $114\frac{6}{91}$ [$\frac{6}{11}$?], would make this $95\frac{228}{460}$ degrees at the equator, in degrees of $62\frac{1}{2}$ miles each, as fixed by many who have determined it. Thus we have $18759\frac{31}{136}$ miles [in lat. 34°] which, divided by 360, makes each degree in lat. 34° equal to $52\frac{1999}{9072}$ miles. Besides this, we have reckoned that 1,200 leagues in a straight line from West to East, from the meridian of those rocks, which are in lat. 32° to lat. 34° would also give those $92\frac{5464}{477733}$ degrees, and thus much more have we sailed to the West than was known to the ancients.

[3.] This distance was noted by us as to longitude with various instruments, sailing without lunar eclipses or other observation for the movement of the sun. Seeking always the height [of the sun] at the time that was proper, the ship was run geometrically [the distance estimated], by the difference between the [midday] horizons, the interval from one meridian to the other being fully noted in a little book, together with the rise of the sea [current] in every climate at different times or hours, which, we think, will not prove useless to navigation. With the best wishes for [advancing] learning, I present it to your Majesty.

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West of the Fortunate Islands, towards the South, to 54 degrees [South] beyond the equator, where they found the land without a termination; then turning North to the equinoctial, following the shore to 8 degrees from the equator, then [the land ran] more to the West, inclining to the North [N. W.] as the said meridian runs, the shore continuing to 21 degrees [N. lat.], finding no end to it. They have sailed $89\frac{[illegible]}{[illegible]}$ degrees, which, added to the $20\frac{[illegible]}{[illegible]}$ [comp. ante], make $110\frac{[illegible]}{[illegible]}$ degrees, and so much they have sailed more to the West, from the said meridian of the Fortunate Islands, in the parallel of 21 degrees of latitude. This distance has not been verified by us, not having made this navigation. It may vary a little more or less. We have calculated it geometrically from the notices of many nautical men who are familiar with it, who affirm that it is 1,600 leagues, judging by the estimate of the run of the vessel according to the nature of the wind. In the succeeding voyage I hope that, in a short time, we shall have further proof. On the other hand, we in this our navigation made by your Majesty's order, besides the 92 degrees which we made from the said meridian towards the West, to the first land found in 34 degrees, sailed 300 leagues to the East and 400 leagues to the North, the shore of the land continuing to the East, until we reached 50 degrees.

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appear, I have better hope and with more reason to exhibit to your Majesty all this new land or new world of which we have described the size as above. We know that Asia joins Africa, and are certain that it is united with Europe by Norway and Russia, and thus know that it is false, according to the ancients, that they could have sailed from the promontory of the Cimbri to the the eastward along the whole north reaching to the Caspian Sea. They likewise [falsely] affirmed that it [the world] was enclosed between two seas only, situated to the East and West, and that these two did not meet each other, for beyond 54 degrees from the equator, towards the South [the land] extends to the east through a great space, and to the North, passing beyond 66 degrees, turning then towards the East till it reaches 70 degrees.

I hope to have within a brief period more certainty about it, with the assistance of your Majesty, whom may the omnipotent God favor with lasting glory, in order that we may see the best results of this our cosmography accomplished in the holy words of the Evangel.

On the ship Delfina in Normandy, in the port of Dieppe, the 8th of July, 1524.

Humilis servitor,

JANUS VERRAZANUS.

XXXIV.—NOTES ON THE COSMOGRAPHICAL PORTION OF THE LETTER.

1. This cosmographical appendix, if entirely the work of Verrazano, shows him to have been well versed in the cosmographical knowledge of the time. He had probably acquired all the cotemporary information that was to be had from the imperfect treatises on the sphere by Ptolemy, Sacro Bosco, Apianus, Gemma Frisius and others, that were studied then.

The first regular treatise on Navigation was that of Raymond Lullius of 1294. Pigafetta, the companion of Magellan, composed a small one about 1530, and Francisco Falero wrote on the longitude; but the first works of general authority on this subject were Pedro de Medina's *Arte de Navegar*, of 1545, and Martin

Cortes' of 1551, which were eagerly translated into other languages.

2. The proportion of $114\frac{6}{11}$ [$114\frac{6}{21}$ misprint] to 360, which he seems to assume as the ratio of the diameter to the circumference, is a convenient but not very correct one, as it fails on the third decimal.* The curious proportion discovered by Metius of 113 to 355 [11, 33, 55; so easily remembered], is correct to the sixth decimal. However, he assumes an equatorial degree to be $62\frac{1}{2}$ Italian miles, or 15.625 leagues, and thus finds that in latitude 34° it would measure about $52\frac{2}{3}$ miles, which is nearly true, for it would be exactly 51ᵐ 815.

At 60 geographical miles to a degree, in latitude 39°, the degree of longitude is 46 ᵐ 63; in latitude 41° 30′, 44ᵐ 94, and in latitude 44°, 43ᵐ 16.

It will be observed that he assumes to have sailed $92\frac{12}{1000}$ degrees from Madeira to the coast of America. On his estimate of $62\frac{1}{2}$ miles to a degree at the equator, and that in latitude 34° a degree will contain 52.22 miles, he makes his voyage to have been 4,804 miles. This is a great overestimate, for there are only 46° 36′ great circle degrees from Madeira to Cape May. This equals 2,433 of his miles, or 2,796 nautical miles, for the true distance from Madeira to Cape May. He, of course, knew nothing of great circle sailing,† and steered as due west from Madeira as possible, and the storm, with deviations from his course, may have made his voyage perhaps one-third longer, say 3,244 of his miles, or 3,728 nautical miles.

On the chart of 1529, the difference of longitude between Madeira and his landfall is only 63°, therefore much less than this estimate, but no measurement is possible or charts of that projection. However, adopting as a scale the Spanish estimate of 750 leagues from the Canaries to the Windward Islands, the

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*Archimedes showed that the proportion was comprised between 3 10-70 and 3 10-71. Verrazano uses the first fraction.

† Pedro Nunez, or Nonnius, the inventor of the scale for reading subdivisions of small lines and arcs, first proved in 1537 that oblique rhumb lines are spirals. Great circle or middle latitude sailing was first introduced in 1623.

The log line invented by Bourne in 1577, was not generally used until long afterwards.

This first part, or *Discorso* as Ramusius well calls it, though a very brief one, gives the author's ideas of the coasts, and of the distances along them, of the known world. It is written in a clear and sketchy manner, and we should like to dwell upon it in greater detail, but shall confine ourselves to the passage in which he alludes to Verrazano.

This discourse appears, from internal evidence (and is admitted by Mr. Margry), to have been written in 1539, and is interesting as presenting the first notice of the voyage of 1524, written by a person who perhaps had known its commander.

"*The land of Norumbega.* Following the direction of Cape Breton [from E. to W.], one meets with a land contiguous to this cape, and whose coast extends westwardly, one quarter south-west [W. by S.], to the lands of Florida, embracing a space of about five hundred leagues. [Our author had clearly not been along this coast himself.]

"This coast was discoverd, fifteen years since, by Messire Jean de Verrazano, who took possession of it in the name of the King, Francis the First, and of Madame, the *Régente.* Many navigators, and even the Portuguese, call it the Terre Française. It ends towards Florida, at the 78th degree of longitude West, and 30th degree of latitude North. The land is very fertile in all kinds of fruits; it grows orange trees, almond trees, wild grape-vines, and a great variety of odoriferous trees. This land is called *Nurumbega* by the natives."

About the name Nurumbega, here first mentioned, much has been written without any satisfactory derivation having been suggested, except that it seems to be a native name with the termination *eg* or *ek*, sometimes found farther south as *og*, *ok*, or *ogue*, which is an adverbial addition, meaning the *place where*, or the *place of*. It is also a common Breton or Norman termination to the name of many places, and thus perhaps its origin may be traced to the early fishing expeditions to these coasts, about which so little is known.

Another suggestion has been made, that the name may date back to the time of Ayllon, for Peter Martyr, in giving the details of the Licentiate's explorations, in the second book of his Seventh Decade of the New World, written in 1524, but not published till 1530, says, "*The Spaniards travelled through many of the great provinces of these little Kings, among which they named Arambe, Guacaia, Quohathe, Tanzacca, Pahor, all the natives of which are dusky.*" As no such name as Arambe or Arambec

appears on he Spanish maps of 1527 and 1529 by Colon and Ribero, which were made up from the very reports of Ayllon and Gomez, and as Peter Martyr's work was probably unknown to the author of the Memoir of 1539, it seems that we have here a mere verbal coincidence. One might as well make Powhattan and Tennessee out of two of the other names.

On the copper globe of 1542, by Ulpianus, (preserved in the New York Historical Society), we find, in the position generally assigned to Norumbega, an attempted latinized form of it as *Normanvilla*. This seems to be its first appearance on a map.

The map of Hieronimus Verrazano shows, however, in the photographic copy of it before us, a trace of a name like Norumbega.

XXVII.—DESMARQUETS.

Jean Antoine Desmarquets, author of the *Memoires Chronologiques de Dieppe*, etc., Paris, 2 vols., 12°, 1785, (Vol. I, page 100,) gives to Thomas Aubert, on his voyage to Newfoundland in 1508, a companion named *Jean Verassen*. He pretends to have found this fact in the old archives of Dieppe, but from the tenor of a foot note on the subject, he does not consider this *Verassen* to be the same person as *Verrazano*, the Florentine.

He adds that in the year 1508 these two captains, in two vessels, ascended the St. Lawrence River for more than 80 leagues (240 geographical miles), naming it thus because they began to ascend it on that saint's day, the 10th of August.

This remarkable statement is entirely isolated, and has not since been verified and confirmed. As the archives of Dieppe were destroyed in the bombardment and conflagration of 1694, and the author of these memoirs had little else to consult but private records, his early history of Dieppe is not considered reliable. There is good evidence that Thomas Aubert did make such a voyage in that year, but the name of Verrassen is not elsewhere mentioned.

The evident desire of Desmarquets to lessen the merit of Jacques Cartier, of St. Malo, a rival seaport, as having discovered the St. Lawrence in 1534, has perhaps led him into putting faith

in some indications of such a previous discovery among the papers he consulted.

Estancelin, a Dieppese himself, and a close student of what is left of the early history of his native place (and whose family papers were used by Desmarquets, as that author states in his preface), found no such name as Verrassen associated with that of Aubert. Compare, op. cit., p. 43 and 222.

XXVIII.—RIBAULT.

Ribault, who sailed for Florida from Havre de Grace on the 18th of February (O. S.), 1562, but did not leave the coast near Brest till the end of February, determined to cross the ocean in a direct line, supposing that he was the first one to attempt it, forgetting or not knowing that Verrazano had done it before. (See Hak. Soc.; Div. Voy., edited by F. Winter Jones, pp. 95–98.) He says: "I determined to prove a newe course which hath not beene yet attempted, etc., to make the furthest arte and traverse of the seas, that ever was made in our memorie or knowledge, in longitude from the East to the West."

They sighted Florida on the last of April, having been delayed by storms, being, therefore, two months on the voyage, which is a fair run, considering the unfavorable season of the year, and the imperfect build of the vessels of those days.

Verrazano was fifty days on the voyage from Madeira to Florida.

XXIX.—TAVANNES' MEMOIRS, 1536.

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influx of the precious metals from the new Indies, and the power conferred by gold on nations possessing it. He also anticipates the use of paper money by proposing the use of tokens of iron, coined "in such a way that it could not be imitated." He closes thus: "This conquest of the New World, proposed to the French and despised by them, is a proof of the little talent of their counsellors, who lost empires for their master, and let their enemies conquer them instead."

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XXVIII.—RIBAULT.

Ribault, who sailed for Florida from Havre de Grace on the 18th of February (O. S.), 1562, but did not leave the coast near Brest till the end of February, determined to cross the ocean in a direct line, supposing that he was the first one to attempt it, forgetting or not knowing that Verrazano had done it before. (See Hak. Soc.; Div. Voy., edited by F. Winter Jones, pp. 95–98.) He says: "I determined to prove a newe course which hath not beene yet attempted, etc., to make the furthest arte and traverse of the seas, that ever was made in our memorie or knowledge, in longitude from the East to the West."

They sighted Florida on the last of April, having been delayed by storms, being, therefore, two months on the voyage, which is a fair run, considering the unfavorable season of the year, and the imperfect build of the vessels of those days.

Verrazano was fifty days on the voyage from Madeira to Florida.

XXIX.—TAVANNES' MEMOIRS, 1536.

There is to be found in the Memoirs of Gaspard de Saulx, Seigneur de Tavannes, of 1536, a curious passage* (which we translated for the Historical Magazine, Vol. VI, 1862, p. 157), in which the author dwells on the rise of prices, caused by the

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influx of the [illegible]
conferred [illegible]
the use [illegible]
coined [illegible]
thus: [illegible]
and [illegible]
coins [illegible]

[illegible]

[illegible]

[

This first part, or *Discorso* as Ramusius well calls it, though a very brief one, gives the author's ideas of the coasts, and of the distances along them, of the known world. It is written in a clear and sketchy manner, and we should like to dwell upon it in greater detail, but shall confine ourselves to the passage in which he alludes to Verrazano.

This discourse appears, from internal evidence (and is admitted by Mr. Margry), to have been written in 1539, and is interesting as presenting the first notice of the voyage of 1524, written by a person who perhaps had known its commander.

"*The land of Norumbega.* Following the direction of Cape Breton [from E. to W.], one meets with a land contiguous to this cape, and whose coast extends westwardly, one quarter south-west [W. by S.], to the lands of Florida, embracing a space of about five hundred leagues. [Our author had clearly not been along this coast himself.]

"This coast was discoverd, fifteen years since, by Messire Jean de Verrazano, who took possession of it in the name of the King, Francis the First, and of Madame, the *Régente.* Many navigators, and even the Portuguese, call it the Terre Française. It ends towards Florida, at the 78th degree of longitude West, and 30th degree of latitude North. The land is very fertile in all kinds of fruits; it grows orange trees, almond trees, wild grape-vines, and a great variety of odoriferous trees. This land is called *Nurumbega* by the natives."

About the name Nurumbega, here first mentioned, much has been written without any satisfactory derivation having been suggested, except that it seems to be a native name with the termination *eg* or *ek*, sometimes found farther south as *og*, *ok*, or *ogue*, which is an adverbial addition, meaning the *place where*, or the *place of.* It is also a common Breton or Norman termination to the name of many places, and thus perhaps its origin may be traced to the early fishing expeditions to these coasts, about which so little is known.

Another suggestion has been made, that the name may date back to the time of Ayllon, for Peter Martyr, in giving the details of the Licentiate's explorations, in the second book of his Seventh Decade of the New World, written in 1524, but not published till 1530, says, "*The Spaniards travelled through many of the great provinces of these little Kings, among which they named Arambe, Guacaia, Quohathe, Tanzacca, Pahor, all the natives of which are dusky.*" As no such name as Arambe or Arambec

appears on he Spanish maps of 1527 and 1529 by Colon and Ribero, which were made up from the very reports of Ayllon and Gomez, and as Peter Martyr's work was probably unknown to the author of the Memoir of 1539, it seems that we have here a mere verbal coincidence. One might as well make Powhattan and Tennessee out of two of the other names.

On the copper globe of 1542, by Ulpianus, (preserved in the New York Historical Society), we find, in the position generally assigned to Norumbega, an attempted latinized form of it as *Normanvilla.* This seems to be its first appearance on a map.

The map of Hieronimus Verrazano shows, however, in the photographic copy of it before us, a trace of a name like Norumbega.

XXVII.—DESMARQUETS.

Jean Antoine Desmarquets, author of the *Memoires Chronologiques de Dieppe*, etc., Paris, 2 vols., 12°, 1785, (Vol. I, page 100,) gives to Thomas Aubert, on his voyage to Newfoundland in 1508, a companion named *Jean Verassen.* He pretends to have found this fact in the old archives of Dieppe, but from the tenor of a foot note on the subject, he does not consider this *Verassen* to be the same person as *Verrazano*, the Florentine.

He adds that in the year 1508 these two captains, in two vessels, ascended the St. Lawrence River for more than 80 leagues (240 geographical miles), naming it thus because they began to ascend it on that saint's day, the 10th of August.

This remarkable statement is entirely isolated, and has not since been verified and confirmed. As the archives of Dieppe were destroyed in the bombardment and conflagration of 1694, and the author of these memoirs had little else to consult but private records, his early history of Dieppe is not considered reliable. There is good evidence that Thomas Aubert did make such a voyage in that year, but the name of Verrassen is not elsewhere mentioned.

The evident desire of Desmarquets to lessen the merit of Jacques Cartier, of St. Malo, a rival seaport, as having discovered the St. Lawrence in 1534, has perhaps led him into putting faith

in some indications of such a previous discovery among the papers he consulted.

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influx of the precious metals from the new Indies, and the power conferred by gold on nations possessing it. He also anticipates the use of paper money by proposing the use of tokens of iron, coined "in such a way that it could not be imitated." He closes thus: "This conquest of the New World, proposed to the French and despised by them, is a proof of the little talent of their counsellors, who lost empires for their master, and let their enemies conquer them instead."

There seems always to have been a vague tradition relating to the object of the stay of Bartholomew Columbus at the French court about 1490,* and also of the undertaking of Verrazano, in 1524, circulating in France, but without positive evidence concerning the success of either.

Montesquieu, for example, says (*Esprit des Lois*, book XXI, chap. XXII), "I have frequently heard people deplore the blindness of the court of France, who repulsed Christopher Columbus when he made the proposal of discovering the Indies."

The general rise in the prices of all the necessaries of life after the conquest of Peru, became so noticeable that it attracted the attention of the government. One of the reasons to which this advance in values was attributed was the exportation of such articles to the Indies. This forms the subject of several petitions to the Emperor, in 1548, with the prayer that such exportation may be stopped. The emperor's answer to one of them, praying that woolen, cotton and silk goods may not be exported to the Indies, is that he has referred the matter to the Royal Council and to the Council of the Indies jointly, and that he will act on their advice. †

The result of this reference is not given, but such a prayer shows how little Spain understood the management of her colonies. As mere producers of the precious metals, the value of these fell as they became more plenty, and no one was the gainer by such a trade.

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XXX.—ANDRE THEVET, 1557.

Thevet does not, in his "*Singularitez de la France Antarctique*," 1557, allude to Verrazano's voyage. This work is generally supposed to have appeared in Paris and at Antwerp, 1558, but we have a copy with the imprint Paris, 1557. In his "*Cosmographie Universelle*," 1575, he speaks of him, but only from the published letter. Thevet, however, is a poor authority, for his statements are often false, and his omissions many. Jean de Lery does not hesitate to call him a superlatively impudent liar.

XXXI.—BELLEFOREST, 1570.

François de Belleforest, in his "*Histoire Universelle du Monde*," 1570, writing, book 4, about the New Lands, gives details, taken from Ramusius, concerning *Verrazan* (as he calls him), but in a marginal note, gives the correct name, *Loise*, to the island off the coast, which Verrazano said was named after the King's mother. It does not appear, however, that he had any map of the explorations before him, while he expressly adds that he had not met with any other account, in books, concerning the Florentine, except in his *Memoir*, meaning the letter to the King. He appears to have misunderstood Ramusius, for the death of Verrazano is noted by him as having occurred about the year 1524.

XXXII.—ITALIAN VERSIONS OF THE HEADING TO THE LETTER.

I. Extracted from Collections New York Historical Society, New Series, Vol. I, 1841, p. 55. Punctuated from Greene's quotation in North American Review, October, 1837, p. 294.

Il Capitano Giovanni da Verraznano, fiorentino di Normandia alla Serenissima corona di Francia dice:

Da poi la fortuna passata nelle spiagge settentrionale, Ser^mo^ Signore, non scrissi a vostra serenissima et cristianissima Maesta,

quello che era seguito delli quattro legni, che quella mandò per lo oceano ad inscoprir nuove terre, pensando di tutto sia stata certificata come dalle impetuose forze dé venti fummo constretti, con sola la nave Normanda e Dalfina affliti, ricorrere in brettagna, dove restaurati avrà V. S. M. inteso il discorso facemmo con quelle armate in guerra per li lidi di Spagna, di poi la nuova disposizione con sola la dalfina in seguire la prima navigazione, dalla quale essendo ritornato, darò adviso a V. S. M. di quello abbiamo trovato.

II. Extracted from Ramusius, Vol. III, 1556, fol. 420.

Non scrissi à V. Maestà CHRISTIANISS. RE dopo la fortuna havuta nelle parti Settentrionali, di quanto era delle quattro Navi seguito, da V. M. mandate à discoprire nuove terre per l'Oceano, credendo che di tal successo convenientemente la fosse stata informata. Hora per la presente le daro à quella notitia, come dall' impeto de venti con le due Navi, Normanda, & Delfina, fummo constretti cosi mal conditionate come si ritrovavano scorrere nella Bretagna. dove poi che furono secondo il bisogno racconciate, & ben armegiatte, per i liti di Spagna ce nandammo in corso. il che V. M. haverà inteso per il profitto che ne facemmo. Dipoi con la Delfina sola si fece deliberatione scoprir nuovi paesi, per non lasciar imperfetta la gia minciata navigatione: Il che intendo hora a Vostra Maestà raccontare, accioche di tutto il successo sia consapevole.

XXXIII.—COSMOGRAPHICAL PORTION OF THE LETTER.

[1.] It remains for me to narrate to your Majesty the order of the said navigation as regards cosmography. As above said, starting from the before mentioned rocks, which are placed on the bounds of the West as known to the ancients, and from the meridian drawn through the Fortunate Islands, in 32 degrees of latitude from the equator of our hemisphere, sailing to the West, unto the first land, we found 1,200 leagues, which contain 4,800 miles, counting four miles per league according to maritime usage,

[The following passages are obscure, and we have paraphrased them as we understand them]

[2.] The proportion $3\frac{1}{7}$ of the diameter to the circle, would make the above distance $92\frac{5464}{472733}$ degrees, in lat. 34 degrees, that of the land first discovered by us. The chord or diameter of a great circle [of 360] being $114\frac{6}{91}$ [$\frac{6}{11}$?], would make this $95\frac{288}{450}$ degrees at the equator, in degrees of $62\frac{1}{2}$ miles each, as fixed by many who have determined it. Thus we have $18759\frac{31}{126}$ miles [in lat. 34°] which, divided by 360, makes each degree in lat. 34° equal to $52\frac{1989}{9072}$ miles. Besides this, we have reckoned that 1,200 leagues in a straight line from West to East, from the meridian of those rocks, which are in lat. 32° to lat. 34° would also give those $92\frac{5464}{472733}$ degrees, and thus much more have we sailed to the West than was known to the ancients.

[3.] This distance was noted by us as to longitude with various instruments, sailing without lunar eclipses or other observation for the movement of the sun. Seeking always the height [of the sun] at the time that was proper, the ship was run geometrically [the distance estimated], by the difference between the [midday] horizons, the interval from one meridian to the other being fully noted in a little book, together with the rise of the sea [current] in every climate at different times or hours, which, we think, will not prove useless to navigation. With the best wishes for [advancing] learning, I present it to your Majesty.

[4.] My intention was to reach [*pervenire*] by this navigation to Cathay, in the extreme east of Asia, expecting [however] to meet with new land such as was found as an obstacle, but I had reason to suppose that it was not hopeless to penetrate to the eastern ocean. This opinion was held by all the ancients, and it was positively believed as certain that our ocean was one and the same as the eastern one of India, without any interposition of land. Aristotle affirms this, arguing by various comparisons, which opinion is much opposed to the modern one, and by experience proved false, because land is already found, unknown to those ancients, another world as regards the one known to them. It appears really to show itself to be larger than our Europe, Africa, and even Asia, if we rightly judge of the size of it, as I will briefly show it in a short discourse to your Majesty.

[5.] The Spaniards have sailed on a meridian $20\frac{22000}{67281}$ degrees

West of the Fortunate Islands, towards the South, to 54 degrees [South] beyond the equator, where they found the land without a termination; then turning North to the equinoctial, following the shore to 8 degrees from the equator, then [the land ran] more to the West, inclining to the North [N. W.] as the said meridian runs, the shore continuing to 21 degrees [N. lat.], finding no end to it. They have sailed $89\frac{29709}{46782}$ degrees, which, added to the $20\frac{32060}{46781}$ [comp. ante], make $110\frac{14830}{46783}$ degrees, and so much they have sailed more to the West, from the said meridian of the Fortunate Islands, in the parallel of 21 degrees of latitude. This distance has not been verified by us, not having made this navigation. It may vary a little more or less. We have calculated it geometrically from the notices of many nautical men who are familiar with it, who affirm that it is 1,600 leagues, judging by the estimate of the run of the vessel according to the nature of the wind. In the succeeding voyage I hope that, in a short time, we shall have further proof. On the other hand, we in this our navigation made by your Majesty's order, besides the 92 degrees which we made from the said meridian towards the West, to the first land found in 34 degrees, sailed 300 leagues to the East and 400 leagues to the North, the shore of the land continuing to the East, until we reached 50 degrees.

[6.] We left the land which in past times was found by the Portuguese, which they followed farther to the north, reaching to the Arctic Circle, leaving its termination unknown. Therefore, putting the Northern with the Southern latitude, that is the 54 degrees with the 66 degrees, they make 120 degrees, which is more than is contained in the latitude of Africa and Europe. For measuring from the extreme of Europe, which are the limits of Norway standing in latitude 71 degrees [71° 12′], to the extreme of Africa, which is the Cape of Good Hope in latitude 35 degrees [34° 51′, both nearly correct], it only makes 106 degrees. If the breadth of the said land corresponds in proportion with its maritime front, there can be no doubt but that it exceeds the size of Asia. In such a shape we find the globe of the earth much larger than it was held to be by the ancients, contradicting the mathematicians in regard to the sea being smaller, for we have seen the contrary by our own experience, and as to its land area, this is, we judge, not less than that of the water. As things

appear, I have better hope and with more reason to exhibit to your Majesty all this new land or new world of which we have described the size as above. We know that Asia joins Africa, and are certain that it is united with Europe by Norway and Russia, and thus know that it is false, according to the ancients, that they could have sailed from the promontory of the Cimbri to the the eastward along the whole north reaching to the Caspian Sea. They likewise [falsely] affirmed that it [the world] was enclosed between two seas only, situated to the East and West, and that these two did not meet each other, for beyond 54 degrees from the equator, towards the South [the land] extends to the east through a great space, and to the North, passing beyond 66 degrees, turning then towards the East till it reaches 70 degrees.

I hope to have within a brief period more certainty about it, with the assistance of your Majesty, whom may the omnipotent God favor with lasting glory, in order that we may see the best results of this our cosmography accomplished in the holy words of the Evangel.

On the ship Delfina in Normandy, in the port of Dieppe, the 8th of July, 1524.

Humilis servitor,

JANUS VERRAZANUS.

XXXIV.—NOTES ON THE COSMOGRAPHICAL PORTION OF THE LETTER.

1. This cosmographical appendix, if entirely the work of Verrazano, shows him to have been well versed in the cosmographical knowledge of the time. He had probably acquired all the cotemporary information that was to be had from the imperfect treatises on the sphere by Ptolemy, Sacro Bosco, Apianus, Gemma Frisius and others, that were studied then.

The first regular treatise on Navigation was that of Raymond Lullius of 1294. Pigafetta, the companion of Magellan, composed a small one about 1530, and Francisco Falero wrote on the longitude; but the first works of general authority on this subject were Pedro de Medina's *Arte de Navegar*, of 1545, and Martin

Cortes' of 1551, which were eagerly translated into other languages.

2. The proportion of $114\frac{6}{11}$ [$114\frac{6}{91}$ misprint] to 360, which he seems to assume as the ratio of the diameter to the circumference, is a convenient but not very correct one, as it fails on the third decimal.* The curious proportion discovered by Metius of 113 to 355 [11, 33, 55; so easily remembered], is correct to the sixth decimal. However, he assumes an equatorial degree to be $62\frac{1}{2}$ Italian miles, or 15.625 leagues, and thus finds that in latitude 34° it would measure about $52\frac{2}{3}$ miles, which is nearly true, for it would be exactly 51^{m} 815.

At 60 geographical miles to a degree, in latitude 39°, the degree of longitude is 46^{m} 63; in latitude 41° 30′, 44^{m} 94, and in latitude 44°, 43^{m} 16.

It will be observed that he assumes to have sailed $92\frac{12}{1000}$ degrees from Madeira to the coast of America. On his estimate of $62\frac{1}{2}$ miles to a degree at the equator, and that in latitude 34° a degree will contain 52.22 miles, he makes his voyage to have been 4,804 miles. This is a great overestimate, for there are only 46° 36′ great circle degrees from Madeira to Cape May. This equals 2,433 of his miles, or 2,796 nautical miles, for the true distance from Madeira to Cape May. He, of course, knew nothing of great circle sailing,† and steered as due west from Madeira as possible, and the storm, with deviations from his course, may have made his voyage perhaps one-third longer, say 3,244 of his miles, or 3,728 nautical miles.

On the chart of 1529, the difference of longitude between Madeira and his landfall is only 63°, therefore much less than this estimate, but no measurement is possible or charts of that projection. However, adopting as a scale the Spanish estimate of 750 leagues from the Canaries to the Windward Islands, the

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*Archimedes showed that the proportion was comprised between 3 10–70 and 3 10–71. Verrazano uses the first fraction.

† Pedro Nunez, or Nonnius, the inventor of the scale for reading subdivisions of small lines and arcs, first proved in 1537 that oblique rhumb lines are spirals. Great circle or middle latitude sailing was first introduced in 1623.

The log line invented by Bourne in 1577, was not generally used until long afterwards.

chart would make his voyage half as much more, say 1125 Spanish leagues of 17½ to a degree.

Some correction, therefore, of his estimate was made by himself or by the mapmaker on the chart. This is proved by an inspection of it, for the difference of longitude between the Canaries and Guadalupe is given as 43°, being very near the real difference, 41° 11′. The difference of longitude between Ireland and Newfoundland is drawn as 31°, the truth being 28′ 04.

3. He says that no eclipse occurred during his voyage. In 1523, there was an eclipse of the moon, March 1; total; 8 P. M., Paris time; but in 1524 the only one was February 19, ¾ digits, at 11½ A. M. In the position he was then in, this slight obscuration happened just before sunrise and could not be observed. In 1525 there was a total eclipse of the sun, at 3 P. M., Jan. 23, which he would have observed if the voyage had been made in that year. His statement fixes the date of the voyage as of 1524.

He estimated the longitude, as he says, by a reckoning from day to day. As he was, of course, not aware of the strong current known as the Gulf stream, he was carried much more to the north than he expected. The little book he speaks of, which must have been a kind of log-book, is lost.

4. His intention, like that of Columbus, Cabot, Cortereal and others, was to discover a seaway to Asia, and he must have been keenly disappointed at his failure to find a strait leading in that direction. He appears to have heard of Ayllon's voyage in 1520, from his evident desire to make land in latitude 34°, and was well informed concerning Terra Nova, but the unexplored gap offered a last hope for discovery, which was frustrated.

This short passage about Cathay embodies a volume of thought which is left unrecorded. It was a fate that other noble adventurers before and since have bowed to, while the search for a seaway, even an impracticable one, is still a goal for ambitious spirits.

The wonderful tales about the Grand Khan had led Columbus to the discovery of the western Indies, which turned out to be auriferous, and Cortes had lit upon a barbarous empire, whose riches were much exaggerated, making men think that the New World was perhaps the equal or perhaps a part of that fabled Cathay, first described by Carpini and Rubruquis.

It was natural, therefore, to suppose that other rich empires might be found in these regions, and this caused Hernando de Soto, in 1539–42, to seek for one in the vast and unknown land known as Florida.

5. The remarks on Magellan's voyage, if penned in 1524, prove that he was well informed on that subject. The first circumnavigation of the globe was completed by the return of the Vittoria, under Sebastian El Cano, September 7, 1522. Peter Martyr at once prepared an account of the voyage, which was sent to the Pope, but it was lost at Rome in the riots of 1527, and no copy of it is now known. The first printed account of it, as prepared by Maximilian of Transylvania, secretary of the Emperor, in the form of a letter, addressed to the Archbishop of Salzburg, dated Valladolid, October 24, 1522, appeared in Rome, November, 1523, and again in February, 1524.

Verrazano, in January, 1524, could hardly have seen this before sailing, but may have read it after his return. Among the various papers taken by him, before 1524, from Spanish prizes, he may have learned of the departure of Magellan, and had, perhaps, conversed with some of the companions of Gomez, and of El Cano.

His expression, therefore, "*that he had calculated the distances sailed by Magellan, from the observations of many navigators,*" proves him either to have been very well informed about that voyage, or else that the appendix was written some time after the date of the letter itself.*

The 300 leagues run northwardly, and 400 eastwardly, along the coast, make up the 700 spoken of at the close of the letter. He does not mean that he sailed 700 leagues along the coast, but that by rhumbs he had estimated the coasts discovered to be 500 leagues, and that his latitudes and departures made up 700.

By his own estimate, therefore, supposing his leagues to mean miles of about 60 to the degree, he had run five degrees of latitude, and about eight degrees (of fifty miles each) of longitude. This is very near the probable extent of his range.

6. By the explorations as far as the Arctic Circle, made by the Portuguese, he alludes to the discovery of Greenland by them,

* Compare, however, with Carlis' letter, who, in 1524, refers to it.

a fact which is now admitted, for Gaspar Cortereal no doubt sighted it in 1500, and it was represented on the early Portuguese charts as *Terra del laboratore*, or *Terra Corterealis*, though this first name is now restricted in its application. We have good reason to believe that Newfoundland, under the name of *Isla Verde* and *Man de Satan*, was known and visited by the Portuguese as early as 1445, and soon afterwards by the Bretons, but that question cannot be discussed here.

Verrazano's speculations on the extent of the New World is the first one of its kind, and as an original suggestion is very remarkable. He does not distinctly aver his belief in the separation of Asia from America, but infers, from the fact that the three great divisions of the Old World are joined together, that America may be also joined to them. By the land of the Southern Hemisphere, he designates the land left to the south by Magellan, which, until the actual doubling of Cape Horn by Cornelison Schouten, of Horn in Holland, in 1619, was considered as a vast continental land, and was represented on maps as extending entirely around the Antarctic regions, in about latitude 50 to 60 deg. south. The Spaniards soon discovered the insular nature of the Terra del Fuego, but did not publish this fact, and Sir Francis Drake, in October, 1578, had done the same, calling its most southern cape *Terra nunc bene cognita.* Schouten's name, however, was the most widely published, and has thus remained attached to it.

XXXV.—EXAMINATION OF THE VOYAGE ACROSS THE ATLANTIC.

He was 25 days making the three-fifths of his voyage or 1200 leagues of the 2000 that he estimated the whole to be, and was sailing due West. This without allowance for currents or deviations from his course would place him in long. 55 deg. on the 11th of February.

From this point he followed a rather more Northwardly course, doing so from a desire probably to avoid the coast explored by the Spaniards, which as he must have known, had reached to lat.

34 deg., for he connects them with his own on the Map. He was also forced, as we shall show, to follow such a course by the Gulf stream, of which he apparently knew nothing.

From long. 55 deg. to the eastern edge of the Gulf stream, which in winter lies in long. 65, on the parallel of 33 deg. 30 min., he may not have drifted much out of his course, though he encountered a gale on the 14th of February that may have driven him to the South of it. But in crossing the Gulf stream from long. 65 deg. to 74 deg., he was exposed, for at least 12 days, out of the 25, which he occupied in running the latter two-fifths of his voyage, to its influence. Its greatest velocity is here about 1½ to 2 miles an hour, but allowing only 1¼ miles as its average set, he would have drifted in these 12 days just 360 miles to the Northward. These six degrees would carry him North of lat. 33 deg. 30 min., the point where he probably first entered the stream, and place his landfall in 39 deg. 30 min., as we make it. He must therefore have passed the Bermudas in lat. 35 deg. (they lying in 32 deg. 20 min.) or 160 miles North of them. This is but a moderate allowance for his drift by the Gulf stream, and we do not see how he could have made our coast in a lower latitude.

This Northwesterly drift caused a vessel seeking our coast, with the Pilgrim fathers, a century later, to land far to the North of the point aimed at, and planted on the rocky shores of New England a colony designed to have been established very near the point where Verrazano sighted it in 1524.

The voyage may therefore be summed up as follows.

January 17 to February 11—25 days due West—1200 leagues by his estimate, or three-fifths of whole distance, in fact 1700 geog. miles of 60 to the degree.

February 11, in long. 55 deg., lat. 32½ deg., steers a little N. of W.—on the 14th encounters a storm, February 18th enters the Gulf Stream in lat. 33½ deg., long. 65, leaving it March 4th in long. 74, lat. 39 deg. and making land March 7. The distance sailed since February 11, 25 days, being estimated by him as 800 leagues, probably 1150 geog. miles.

The great circle distance, the shortest possible one between his point of departure and arrival, is 2796 nautical miles, as noted elsewhere, but by the courses he followed, his track, which is

much to the south of that, cannot therefore have been less than 2850 nautical miles, and was no doubt much longer.

XXXVI.—THOMASSY.

Les Papes Geographes et la Cartographie du Vatican. Par M. R. Thomassy. Paris, 1852. 8vo., pp. 140. Extrait des Nouvelles Annales des Voyages, 1852.

After an interesting and carefully prepared essay on early chartography and the progress of Geographical knowledge during the middle age, the author describes the topographical frescoes on the walls of the galleries of the Vatican, and in an appendix notices a few of the most remarkable documents of the same kind, preserved in the *Collegio de Propaganda Fide* on the *Piazza di Spagna.* This College was founded in 1622 by Gregory XV, during his two years' Papacy, for the purpose of educating foreign students as missionaries. Its printing office, established by his successor Urban VIII, (1623–44) who caused its present building to be erected, is able to produce books in every known written character.

The geographical documents gathered here are from the collection of Cardinal Stefano Borgia and are collectively known as the *Museo Borgiana.* Mons. Thomassy describes in the appendix to his essay, sixteen of these, including the great bronze enamelled planisphere of the first half of the fifteenth century, of unknown authorship, and of which an account was published by the Cardinal in 1797.

The next article, pages 112–115, describing one of the drawn maps, is the one that interests us especially. We extract the chief points relating to it.

"This planisphere is on a roll of parchment (three skins joined) 2 metres 60 centim. long, and 1 metre 30 centim. wide.

"It is a marine chart, bearing on its back in a modern hand the meaningless title: *Carta pecora di una gran parte del mondo*" (a parchment map of a great part of the world).

"On the upper part one reads *Hieronimus de Verrazano faciebat.*"

"The date may be deduced from the following inscriptions. Under the word *Nova Gallia sive Jucatanet*, is found: *Verrazano sive Nova Gallia, quale discopri, 5 anni fa, Giovanni da Verrazano fiorentino, per ordine, e commandamento del cristianessimo re di Francia.*"

Mr. Thomassy adds that, "as the letter in Ramusius is dated 1523 or 1524 this would give to the Map the date of 1528." (The date of the letter is however, most distinctly 1524, which places the Map in the year 1529.)

"The prime meridian passes near the Island of Ferro, which is in lat. 27° and some minutes."

"The equator passes through the Island of St. Thomas, the straits of Sunda and the mouth of the Amazon River."

"This Jerome, author of the map, must have been a relative and very probably the brother of Giovanni, who wrote the letter to Francis I."

He quotes, to support this opinion, the letter of Annibale Caro, elsewhere mentioned, and says that Tiraboschi speaks of this brother, otherwise unknown, not naming him, but as one well versed in geography.

A copy of the scale is then given, and he proceeds to describe some features of the Map.

"At *c. de Bretton* the shield and ermines of Brittany are seen, and North-east of this, *Terra laboratoris. Questa terra fu discoperta da Inghilesi*, the most northern point in this direction."

"In the East it ends with the *Insule Meluco and Borneo.*" (Burnei.)

"On the meridian of the Moluccas is seen the Gulf of Canton, with the legend: *In questo Golfo di Caitan, stan le navi che vengono d' India, a queste regioni, del Gastaio.*" (Of Cathay.)

After indicating some European and African points, he closes his description thus:

"Terra del Fuego is vaguely drawn as the beginning of an extensive Australian continent. All the western shores of North America are wanting" (except about the Isthmus) "and are designated only with TERRE INCOGNITE. Finally Greenland is not shown at all, in which point this Map differs from others of this date."

XXXVII.—DESCRIPTION OF THE MAPAMUNDI OF HIERONIMUS DE VERRAZANO.

The interesting mapamundi drawn by Hieronimus de Verrazano, which is now preserved in the Museo Borgiana at the Collegio de Propaganda Fide in Rome, and to which attention was first drawn by Mons. Thomassy in 1852, is not accompanied by any

record of its history prior to its ownership by the late Cardinal Stephano Borgia. It is remarkable that the Cardinal himself should not have noticed its value as a document confirming the discovery of a portion of the American coast by an Italian, for he was an intelligent judge in such matters, and the owner of several other geographical monuments, of which two have been specially described.

One of these was a Cufic celestial globe of copper, made in the year 622 of the Hegira (A. D. 1225), which was described by Simon Assemann in 1790. The other was a bronze circular table, twenty-seven inches in diameter, with a map of the world engraved in *niello*, made at the beginning of the 15th century.* The Cardinal, in 1794, corresponded with the learned De Murr, author of a life of Martin Behaim, on the subject of this map, and his nephew, Camillo, printed an account of it, for private circulation, with a full sized copy of it, in 1797. It was again described and copied by Heeren in 1808, and Santarem in 1852, and several treatises on it in manuscript are preserved in the Museum.

As regards the time when the Cardinal became the owner of the Verrazano chart or whence he procured it, we can furnish, as above stated, no information. The first notice of it appears in a letter to De Murr, dated January 31st, 1795, in which the Cardinal informs him that besides the two geographical monuments above mentioned, he had thirteen maps on parchment, most of them nautical charts, of which four were mapamundis. Among these he enumerates a few, one of which he speaks of in these words: "*Altra porta il nome de Girolamo Verrazano, fratello di Giovanni, che scopri una parte dall America Settentrionale, e cosi altre.*" The Cardinal here assumes that the two Verrazanos were brothers, perhaps from the passage in the letter of Annibale Caro. He must have mentioned this map in another letter to De Murr, who, in giving a list of the Cardinal's maps, attaches the date 1528 to its title. The first notice of the existence of the Verrazano map was published at Gotha, in 1801, in De Murr's revised edition of his life of Martin Behaim, which was translated by Jansen and published at Paris in 1802.

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* See *Santarem: Cosmographie du Moyen Age*, III, 247.

The Cardinal was secretary of the Propaganda for eighteen years, from the year 1770, and became a cardinal in 1789, dying at Lyons in 1804 (while accompanying the Pope to Paris), at the age of 73. His palace at Velletri, on the Via Appia, a few miles south of Rome, was a complete museum, in which he had gathered together works of art of every description, which were freely exhibited to visitors and students. He bequeathed the collection to the Propaganda, but it does not appear to have been immediately removed to Rome, for Lord Kingsborough refers to a valuable Mexican pictorial manuscript which he had copied, by Aglio, about 1828, for his great work, as being still in Velletri.

We cannot here furnish farther biographical details concerning this amiable and accomplished prelate, which may be found in the eulogies of him published shortly after his decease.* Of these, one may be cited as containing a short description of his museum, in which there is a second mention of the map we are describing. This was penned by the learned Cancellieri, author of the *Notizie di Colombo*, † who, in 1802, was appointed director of the printing office of the Propaganda, and it was printed in several forms in 1805. We have not been able to consult this eulogy, nor one of the same date by the P. Paulino de S. Bartolommeo, his intimate companion for fourteen years, but it was doubtless the first of these that contains the notice in question.

The next reference to it is to be found in Millin's Magazin Encyclopedique (Vol. 68) for March, 1807. Millin, the learned archæologist, corresponded with the Cardinal (who was a contributor to his periodical), and published a short biography of him, chiefly made up from the above eulogies, at the close of which (page 25), he enumerates a few of the most precious articles contained in his museum. Among these, four maps are named, the third being "*de Jerome de Verrazano l'an* 1528." These short references appear to have passed unnoticed, and the map was left in repose for another half century, until examined and briefly described by Mons. Thomassy in the Nouvelles Annales des Voyages for 1852.‡

The map is on three sheets of parchment, and according to

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* See also the *Biographie Universelle*. † *Roma*, 1809. See note page 187.

‡ Lelewel. *Géogr. du Moyen Age*, 1852, Tom. I., § 256, copies De Murr's notice of it.

Mons. Thomassy is two metres 6 cent. long, and 1 metre 30 cent. wide, or 102½ by 51½ inches, that is, the length is twice the height. It is well preserved, being somewhat stained near both ends, but no part of it is indistinct. The drawing is sharp and clear, though the reduced photographs before us have not been taken with sufficient care to enable the smaller text to be deciphered. The larger photograph is $\frac{4}{10}$ the size of the original chart, but is very indistinct; the smaller one is $\frac{14}{100}$, and is in places as sharp and distinct as could be desired, but in others is quite illegible. On this account we cannot undertake a close analysis of this interesting document, in order to fix its date more positively, or to ascertain what materials were used in compiling it.

We can, however, from the chart itself, determine some points that connect it with our navigator. It is the work of an Italian hydrographer of considerable skill, and is in many respects superior, as a work of art, to any Spanish or Portuguese chart of that time. The designer had before him materials such as no hydrographer up to that date had been favored with. His draught of the Spanish coasts of America appear, however, to be from a different pattern than those used by Diego Ribero in his chart of 1529, but in many other respects it is much in advance of it. His work seems to include and embody discoveries made by sea up to the year 1524, the date of Verrazano's voyage. No chart outside of Spain for many years after this date contains what is to be found here. The voyage of Magellan, the discoveries of Cortes, the opening of the East Indies by the Portuguese, are all laid down in a way that is surprisingly accurate, and lead to the conclusion that no one but Verrazano could have prepared it. He had captured charts from the Spaniards and Portuguese, had conversed with the sailors of the discovery vessels, and was thus better prepared than any navigator of his day to attempt a general *resumé* of the state of cosmographical knowledge then existing in Europe.

The projection of the map is the simple cylindrical square one, in which all the degrees of latitude are made equal to each other and to the equatorial ones.* This is the earliest marine projec-

* For an interesting and careful analysis of the projection of geographical maps, see *Davezac; Bulletin de Géographie*, 5th series, Vol. V, 1863, p. 257.

tion of which we have any record, and was used by Mediterranean sailors in the oldest known charts, which, however, do not reach back of the early part of the 13th century. Had the simple conic Ptolemaic projection been adopted by the constructors of such charts many nautical mistakes would have been avoided, and navigators would have made shorter voyages from point to point.

Like most of the maps of the world at that time, it has the equator drawn below the middle of the map, and shows 90° of latitude north and 64° south of it. In breadth it represents about 320° of longitude. Its western, or left, side is 45° west of Temistitan, or the city of Mexico, and its eastern, or right, side is 35° east of the peninsula of Malacca. There is no graduation for longitude, but the meridians that cross the centres and sides of the two great circles of windroses appear to be drawn seventy degrees apart.

Until quite a recent date all nautical charts were covered with a net work of cross lines radiating from windroses, the centres of which were generally symmetrically arranged to suit the taste of the designer. On this map there is one great central rose in N. lat. 16 deg. in the western part of Africa. Two great circles of roses, 140 deg. in diameter, touch each other at this point, each circle bearing fifteen other and smaller roses, equally spaced around their circumference. From the centres of each great circle and of each rose there are drawn thirty two lines to each point of the compass, and these lines are prolonged to the margin of the Map. This construction was intended to facilitate the pricking out of a ship's course on the chart and save the use of a protractor.

The lines that in this manner appear parallel and at right angles to the equator are not, as in modern charts, parallels and meridians. The tropic lines appear with their names on the map. The meridian that passes through the third roses from the great central one, on the left great circle, is divided into degrees of latitude of equal size, each one numbered. Close to the upper margin and to the left of this graduated meridian there is a small scale under which is a legend explaining that from point to point there are ten leagues, which are each of four miles. The scale which is equal to 18 deg. of latitude in length, is subdivided into

six parts, each part having four divisions or points. This graduated meridian lies about three degrees to the West of Iceland and of Africa, passing between the Canaries and Cape Verd Islands. It is about twelve degrees east of Cape St. Augustine in South America. In Ribero's map of 1529, and the one believed to be by Hernando Colon of 1527, as also in others, it occupies the same position.

Near the upper margin and above the coast explored by Verrazano, there appears written in small Italian capitals HIERONIMUS DE VERRAZANO FACIEBAT, the last word being below the others. There is no date written anywhere, but it is assumed to be of 1529, from one of the legends on the coast mentioned below.

Europe is well represented, excepting Scandinavia, which last is copied from the Ptolemies of that date. Africa is remarkably well drawn and its coast is fringed with closely set names and Portuguese shields. On Madagascar we read INSULA SANCTI LAVRENTII and a legend near *Socotra*. The Red Sea is nearly as large as the Mediterranean, but without a fork at its northern end. The Nile takes its source south of the equator from two lakes. The Persian gulf is nameless and Hindostan with Ceylon, are shown more correctly than on any map of the time drawn outside of Portugal. CAMBALV is on the west bank of the Indus, at the mouth of which there is a legend of four lines. At the base of the peninsula appears REGNO DI NARSINGA,* described at great length by Duarte Barbosa in 1516. Near the West side of the mouth of the Ganges appears *Tarnasari* (Tenasserim). Further south a church with a steeple, and on the point of the peninsula REGNO DI CALICUT. On the island is ZAILON INSULA, but a legend near it is illegible, as well as the coast names on the peninsula. The Maldive Is. are indicated, but without a name. There are no Portuguese shields on the coasts of India or Asia.

The peninsula of Malacca is represented as broader and longer than the Indian one, ending close to the equator, and in longitude 150 E. of the above mentioned graduated meridian, or 180 deg. E. of the mouth of the Amazon river in Brazil. At its base is REGNO DI BONGALA, (Bengal, much displaced.) Further down a

* Probably from *Nahry Sankar*, a province of Thibet, once supposed to be the place where many rivers of Hindostan had their source.

huge mountain under which is the legend, *In questo montagna Se irovano e diamante*, then REGNO DI PEGU, and *qui se trovano Rubis in gran quantita*, then a city and under it MALACCA and a long legend, of which we can only decipher the words *conquista i portogesi * * * dispagloli.*

There are a few coast names on the west and some unnamed islands in the SINUS GANGETICUS. Southwest of Malacca is a very large Island with its western shore ill defined, on which is TAPROBANA INSULA SIVE SAMATRA, with no coast names. The eastern coast is quite well represented.

S. E. of Sumatra two smaller nameless islands appear, faintly traced, and a group of very small ones South of Malacca. East of the two unnamed islands, which are S. of the equator, there is a square island, smaller still, on which we read TIMOR, and there are two large banks with small islands E. and N. of it. N. E. of these, on the equator, is a group of seven small islands marked *Insule maloques.* East of these is a large and faintly defined island marked BURNEI. North of these last, and nearer to the coast, is an unnamed group intended perhaps for the Philippines.

The East coast of Asia is from the Ptolemies of that date and it would be useless to give the names of the provinces indicated, except that of LACINA and to observe that a legend of four lines appears in a gulf North of it, which according to Thomassy reads *In questo golfo di caitan stan le navi che vengono d' India a queste regioni del Gastaio.*

These data show that the designer of the Map had drawn his information from the most recent Portuguese and Spanish sources, and circulated it in spite of a prohibition by these nations against its publication under penalty of death.

The following dates will confirm the above statement. Lopez Sequeira reached Malacca in 1509, and Alfonso de Alboquerque took it July 5, 1511, and sent expeditions to Siam, Tenasserim, Cingapoura &c. Anton de Abren reached the Moluccas, Pegu was heard of, and Sumatra and Java were visited in the same year, but the southern coasts and general conformation of these last were not known for some years afterwards. Simon d' Andrade in 1513, first visited the Maldives, and not until this same date did Portuguese vessels navigate the Red Sea and Persian gulfs.

Borneo, already mentioned by Ludovico di Varthema as *Bornei*,

was first reached in 1513, but was not fully explored. On the Map it is placed east of the Moluccas. In 1516 Ferdinand Perez first visited China at Canton by sea, and sent an embassy to the Emperor. In the same year Portuguese vessels sailed to the Ganges and in 1518 entered Bengal.

Luzon of the Phillippines is spoken of in 1511,* but was probably not visited till later. Celebes, which must have been passed in going to the Moluccas, though known to Barbosa, was not officially examined until 1525 by Garcia Henriques. New Guinea was discovered by Don Jose de Menezes in 1526. The Spaniards soon began their explorations also, and Verrazano as we know, had heard of the return of El Cano, but the map contains nothing in this portion of it which would appear to have resulted from them. Nor does it contain any discoveries made by the Portuguese after 1520.

There is nothing in the Eastern portion of this Map to prove that Verrazano had been there in person, but we cannot affirm this positively. It seems however, in regard to this portion alone, to be a very remarkable document, and deserves close study on the part of those who can best appreciate its value. In many points it is not as full as Diego Ribero's mapamundi of 1529, as described by Sprengel in 1795. Both Verrazano and Ribero appear to have used Odoarte Barbosa's description of Southern Asia prepared in 1516, of which several manuscript copies seem to have been in circulation, though the partly incomplete Italian translation given by Ramusius in his first volume, was its first appearance in print. Barbosa had been to the Moluccas by way of the Cape of Good Hope, and accompanied his brother in law Magellan, on his voyage in the other direction. He was killed by the side of Magellan at Matan, being the first man who had *actually circumnavigated the globe.*

Turning to the Western portion of the Map, that is the part west of the graduated meridian, there is much to interest an American, and were the photographs distinct, and the coast names at all legible, we might examine it in detail, and compare

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* Barbosa does not seem to have heard of the Phillippines, though he mentions *Chanfa*, which corresponds to Formosa, and the *Lequeos*, or Lieu-choo Islands.

it with the well known chart of Diego Ribero of the same date. The coast lines vary sufficiently from the known Spanish charts of that date, to lead one to suppose that Verrazano copied from a pattern map unknown to us.

In some parts it is more correct than Ribero's, but a fatal error, originating perhaps with Columbus, deforms the tropical portion of it and affects the parts adjoining these. This error arises from placing the Islands of Cuba, Espanola and Jamaica, north of the Tropic of Cancer. The whole of the Gulf of Mexico is thus displaced about six or seven degrees in latitude too far northwardly. The northern coast of Cuba is more than seven degrees north of the position assigned to it by Ribero, and by modern geographers.

The northern coast of South America at Santa Marta is over five degrees out of place, but it declines thence rapidly to the Eastward, so that Trinidad is only two degrees from its true position. From this point the coast resembles Ribero's map, both of them being deficient in not exhibiting the prominence formed by the Guiana's. The mouth of the Amazon is directly under the equator. The *Bahia de todos los Santos* is placed, as it ought to be, at the bottom of a shallow but extended depression of the coast line, not indicated in Ribero's map. The mouth of the La Plata river is correctly shown under lat. 35 deg. The Strait of Magellan is indicated, but not with the same accuracy as in Ribero, and the south shore of it is faintly drawn out towards the East and South east, two thirds of the way towards the graduated meridian, as an Antarctic continent. The longitudes vary but little from Ribero's chart.

There are numerous coast names along the whole continent, beginning at the strait, where we read *C. della victoria*, and so on, but many of them differ from those given on the Spanish maps. Four Portuguese shields are on the present Brazil, which is marked TERRA SANCTE CRVCIS and VERZINO. Four small, named Islands are in the ocean, to the east of it. A legend west of the La Plata reads *Hic Hispani gigant H* * * ; appearing incomplete.

In the interior of the continent is a range of mountains, running east and west, and under them MUNDUS NOVUS. The northern portion, west of the Maranon, has three Spanish shields.

Under the coast of Caraccas is TERRA AMERICA, beneath it DABAIBA, and to the right under the Guiana's, and near the line, PARIAS.

A curious feature of the map is a western coast line, completing the continent from the strait to the isthmus, along which appears TERRA INCOGNITA, the last word being repeated. There is no trace of Peru; the name of which, with a long legend, is found in Ribero's but not on Colon's chart of 1527.* Johann Schoner on his globe of 1520 had represented a Western coast to the Southern continent, which was also mere guess work.

We cannot decipher the whole series of names along the coast, but have read enough of them to induce the belief that they were not taken from the same *padron* or pattern as Colon's and Ribero's maps of 1527 and 1529, which were prepared as standards for the use of Spanish sailors. The details of the coast line vary also from the above charts, and sometimes are more correct than either of them, but we cannot here compare them without occupying too much space.

IVCATANA is represented, as on many maps of the time, as an island, though its southern coast line is not quite closed. In Colon's and Ribero's maps it is made completely insular, but in the last separated by a narrow strait only from the mainland.

The isthmus of Darien is made too wide, and the Pacific outline of it seems to be a random draught, without names or legends, and the Mar del Sur bears no title. In the charts of 1527 and 1529 the names are numerous, the Pacific coast lines ending in both of them at the Sierras de Gil Gonzales Davila, the limit of the explorations of this gallant explorer in 1523, in N. lat. 16°, being the present province and Sierras of Soconusco.

Verrazano's coast line, however, is boldly continued Westwardly, Northwardly, and then Easterly, ending at his supposed isthmus north of Florida. A large *crescent-like* land is thus formed larger than Europe, and which bears the name NOVA HISPANIA. The parchment is damaged along the westerly part of this land, but the line can be traced, and TERRA INCOGNITA is twice inscribed along its shore. Seven Spanish shields are drawn

* A province or rich Empire called *Biru* was described to the Spaniards in 1522. See Herrera III. V. XI. p. 169.

on this land near to and following the easterly coast line. *Cozumella* is shown, but not the Guanasa Islands. Along the isthmus, beginning West of Yucatan, is the legend CULVACANA. Although partly misapplied, it is remarkable that this name should appear on a map made by a stranger, for it is not to be found on the two Spanish maps above mentioned. This, with other indications, show that Verrazano was thoroughly well informed about the movements of Cortes, having no doubt found charts and despatches in the prizes he captured, besides conversing with men on their way home from Mexico. The want of names along the shores of the Mar del Sur is explained by his want of information touching the explorations of Balboa, Davila and others, accounts of which had not fallen into his hands.

The coast of the Gulf, round to Florida, and to the isthmus north of it, is lined with names, which are almost all illegible. In the interior of New Spain, and in the same latitude as the north side of Cuba, a large city appears with the name TEMISTITAN, the earliest name by which the City of Mexico was known. A little below is GALATIA PROVINCIA, showing that Verrazano was better acquainted with his Bible than with the inland geography of Spain.

The outlines of the Gulf are remarkably accurate for the time, far better than the tracing which accompanies Francisco de Garay's Cedula of 1521, as given in Navarrete's Collecion, Vol. III. They are even more correctly given than on Colon's or Ribero's maps.

The greater and lesser Antilles, or the Leeward and Windward Islands as sailors call them, are very correctly drawn, though the first are placed much too far to the north. The last are entitled INSULE DI CANIBALI, and the first ANTILIE INSULE. About twelve names appear on the lesser Antilles. On the greater ones we read ISABELLA SIVE CUBA INSULA, ISPAGNOLA SIVE SANCTO DOMENIGO, *Iamaica*, *S. Ioannes*, this last appearing very faint on the photographs. The Bahamas are nameless. The Bermudas are not shown, although known to the Spaniards before 1511, since they appear on the map in the first edition of Peter Martyr's first Decade of that date.

The Peninsula of Florida bears the inscription TERRA FLORIDA, Verrazano restricting it to this only, while the Spaniards applied

this name to all the land north to Bacalaos. The outline of the peninsula is not like Ribero's, but is made square at the end, as found in some older charts, and its southern termination is in 33½ deg. N., of his scale. Ribero has it correctly in lat. 25 deg. N. This error, derived in part from the false position assigned to Cuba by Columbus, influenced and no doubt puzzled our chartographer, who in the very portion of the Map most interesting to us, has been forced to alter the draughts supplied by Giovanni, and thus deformed the general bearings of the coasts explored in 1524.

The coast names cease near the westerly base of the peninsula, and reappear at its easterly base. Here are seven coast names almost illegible, and then follows the isthmus, which no doubt marks the land fall of Giovanni in 1524. To the right of this we read *Da questo mare* | *orientale si vede* | *il mare occidentale.* | *Sono 6 miglia di terra* | *infra l'uno a l'altro.* | . (From this oriental sea is seen the western sea. There are 6 miles of land between one and the other.)

This isthmus is about two degrees of latitude long, and its western shores decline respectively to the West and to the North. The southerly extension runs parallel with the shores of the Gulf of Mexico, some five degrees of latitude distant from it joining the imaginary westerly boundary of Nova Hispania above mentioned, while the other shore curves to a due northerly course and terminates in lat. 65 N.

This western sea is nameless, though it appears on many subsequent charts as the *Mar di Verrazano.* As there is not a word about it in the letter of July 8th, 1524, all that relates to its appearance on the chart must be conjectural.

Since there are none but Spanish names south of the isthmus, it is very probable that the new explorations of Giovanni begin at this point. Another feature on the Map confirms this view. Along the coast from this point North are drawn three square standards whose staffs rest on the coast, the first one resting on the north end of the Isthmus. The second one rests on the point where Verrazano made a fortnight's stay, and the third one probably indicates the point where he left the coast. These flags are almost black in the photographs before us, but there appears

to be a circle of perhaps *fleur de lis* on them. In the original they are probably colored blue.

This Isthmus, which Verrazano meant to be in lat. 34 deg., is in lat. 42 deg. according to the chart before us, and in restoring the true draught of Verrazano, the scale of latitudes must begin from this point as 34 deg. N.

For the courses from this point to Bacalaos, we must refer to the enlarged sketch of the chart, copied as best we could from the photograph at our disposal. At first, after turning a cape near the Isthmus, the coast has a Northeasterly trend past one river, probably Barnegat inlet, to a river, which we believe is meant for the Hudson. Thence it runs E. N. E. returning suddenly North for a short distance. This is probably intended for Long Island. At this point there appears to be a deep indenture of the coast, left open, which is doubtless a representation of Long Island Sound and the Thames at New London.

Beyond this the land again trends Easterly, and there appears a broad promontory, probably the result of considering Fishers Island and Point Judith as united, and then we find a deep curve inwards and northwards with three deep bays and a triangular Island off the coast in the bight of the curve, placed very like the I. of Rhodes, and west of the bays. The Island is distinctly named *Luisia* or *Luisa*, after the Mother of the King. The indentures represent no doubt the three entrances of Narragansett Bay, where Verrazano made a stay of fifteen days. Here another flag is placed.

East of this the coast drops a little to the Southward, and runs out in a long point represented by dots, and on which we read *arenosa punta*, signifying a sandy cape. This point is probably intended for Nantucket shoals and Cape Cod taken as a whole, and as a first attempt to represent this striking feature of our coast is most remarkable. Neither Estevan Gomez, who, in the following year, traced this coast from North to South, nor any subsequent navigator who has left any record of his voyage, describes this prominent peninsula so as to positively identify it, until Champlain's time. After turning Cape Cod the coast is represented with a general trend to the East-North-East, with no important projections or depressions, excepting one river with a wide mouth, and a bay just east of it, forming a rather wide

estuary, which may well represent the Kennebeck or Penobscot Rivers in the present State of Maine. The islands which characterize the broken coast line of this State, and which number over three hundred, do not appear on the map, although Verrazano says in his letter that he counted thirty-two in the space of fifty leagues. This statement, with the account of the rugged shores seen here, identify the coast as that of Maine, and could hardly have been invented by one who had never sailed along these shores.

A little East of this larger river appear two small ones entering a shallow bay, and just east of the second one we read distinctly *monte*. These features may be intended as a rough representation of the apparently double mouth of the Penobscot, with Mount Desert just east of it.

On another river, further on, we read *Vendome*, and the fifth name east of it is either *aranbega* or very much like it, the initial *a* and final *bega* being quite distinct. There is no river near it, nor anything to distinguish it from the other coast names, and the mapmaker may have inserted it here, copying from some draught now lost. We have spoken of *Norumbega* in another note, but would remark that this seems to be its first appearance on a map, and that not until 1539 did Pierre Crignon describe this part of the coast under the name as last written. Back of these notices no mention of such a name for a land river or town has been found, except that Peter Martyr, in his seventh Decade, enumerates *Arambe* as one of the provinces visited by Ayllon in 1525, but he was speaking of places in Chicora (Cherokee), much to the south of this one. The resemblance of this name to the one of Crignon's deceived Hakluyt at a later date, who combined them to form the word *Arambec*, which he identifies with Norumbega. As the seventh Decade of Martyr was not published until 1530, Crignon could not have derived it from that source.

The third French flag is placed on the River Vendome, probably indicating the point of Verrazano's departure from the coast, which would thus be near Mount Desert, or a few miles north of the parallel of 44° N. On his return he, no doubt, procured a chart of the coasts of the land of the Bretons, and of Terra Nova, and thus completed his tracing of our coast.

Over the three flags appears, in capital letters, the inscription NOVA GALLIA | SIVE IVCATANET | and the following legend: *Verrazano siue noua gallia quale discopri* | *5 anni fa Giouanni di Verrazano fiorentino* | *per ordine et comandameto dal Crystianissimo* | *Re di francia* | (Verrazano or new Gaul which was discovered 5 years ago by Giouanni di Verrazano the florentine by the order and command of the most Christian King of France.)

This is the only clue to a date for the chart, which cannot have been drawn later than 1529. Verrazano, in his letter, does not propose the name *New France*, but no doubt, did thus apply it shortly after writing to the King. How the name IVCATANET came to be applied to it would be difficult to answer, and we cannot discuss that question here. The third name, *Verrazano*, was probably a suggestion by the draughtsman, the relative of the explorer. If Giovanni had died before 1529, the fact of his demise would most probably have been recorded in this legend.

There is little to add to complete our notice of the map. There is no indication of the Bay of Fundy, or of the peninsular character of Acadia. The name of Cape Breton can be distinctly read, and there is a broad opening drawn between it and the land east of it. In this opening there is an island, and the words *G. de S. Ioanni* and *I. de S. Ioanni*, just above which appears the shield of Brittany.

These names recall Cabot's Island of St. John, discovered by him on the 24th of June, 1497, and distinctly laid down on his Mapamundi of 1544, although he there seems to have raised it slightly in latitude, perhaps because he took Cartier's group of the Magdalen Islands, which he places just east of it, to be a part of his own Island. If laid down on the map before us from Cabot's data, it would be the first known indication of his discoveries. If this were so, however, we ought to find the Gulf inside, in which he got imbayed on that voyage, and the ice-bearing Straits of Belleisle, by which he left it to return to Bristol.* It is not known who gave to this Gulf the name it here bears, nor that of *Golfo Quadrado*, by which it was known to Gomara in 1552. The southern entrance into the Gulf has no name at this day, and *Cabot's Strait* would be a very appropriate one for it.

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* See Hist. Mag., N. Y., Vol. III, Ser. II, p. 129.

East of this opening is a land entitled TERRA NOVA SIVE LE MOLVE, bearing along its easterly coast the usual well-known names, *C. raso*, *C. de spera*, *bachalaos*, *Illa de San Luis*, *Monte de trigo*, *Illa dos aves*, etc., of Portuguese, Basque and Breton origin. The southerly coast bears no names. It is uncertain who first gave the name Terra Nova to this Island, which first appears nameless on a map made by Pedro Reinel,* without date, preserved in Munich. We confidently believe that this map, or the original of it, was drawn for Prince Henry the Navigator, who died in 1460, for it contains his possessions only, beginning with the newly found Cape Verd, in Africa. Back of the land meant for Terra Nova are painted two shields, one bearing the arms of Portugal, five white balls on a blue ground, and the other a red Maltese cross on a white ground. The Prince was the Grand Master of the Portuguese Order of Christ, which, in that kingdom, succeeded the Order of Knights Templar, after it had been uprooted elsewhere. This ascription of the land to the Prince, and the total absence of any trace of the Spanish discoveries in the Atlantic after 1492, would seem to give a pre-Columbian character to this map, which entitles it to much more notice than it has hitherto received at the hands of Dr. J. A. Schmeller and F. Kunstmann, who have described it as not anterior to the supposed discoveries of the Cortereals, in 1500 and 1501. Reinel's map bears a trace of even an earlier knowledge of Newfoundland, for in the same parallel, but further eastward, there is drawn a large island, with a bank or shoal around it, which is named *I verde*.

We cannot pursue this subject now, but a comparison of Verrazano's with Reinel's map will prove that the former was copying the latter in this portion of the map. On the map of Juan de la Cosa of 1500, drawn before Gaspar Cortereal's return from his first voyage, we find an *Y. Verde* in a similar position, as shown on the copy of it as given by Humboldt,† though on Jomard's fac-simile it is named *S. Grigor*. From these and other indica-

* Pedro and his son Jorge were in the service of Spain in 1519, as map-makers; *Navarette Coll.*, III, 155. A Pedro Reinel is mentioned, in 1487, by *Barros*, Dec. I, liv. 3, cap. 12.

† *Examen Critique*, Vol. V, and Ghillany's *Behaim*. The name, however, will probably be found on the orignal map, now in Madrid.

tions we are led to believe that Newfoundland, under the name of *Isla Verde* or *Bacalaos*, and others, was known to fishermen, if not to geographers, long before Cabot's time. Bacalaos, the Iberian name for the codfish, would be translated by the French *Molue*,* from the Latin *Molva*, and thus it appears on Verrazano's map.

North of Terra Nova there is a broad but nameless estuary or opening of a strait, separating it from a great peninsular land, whose broad southern termination, in lat. 59½°, is east of and opposite to the north end of this last, while its easterly outline runs towards the North, ending in lat. 76° N. On this land, the map being reversed, we read TERRA LABORATORIS, and with the map upright, the legend "*questa terra fu discoperta da inghilesi*," and over all a shield bearing the cross of St. George.

The Strait is no doubt meant for the *Rio Nevado* of the Portuguese maps, and is probably the representation of the ice loaded current separating North America from Greenland. One of the Cortereals appears to have sighted Greenland, not recognizing it as the Greenland of the Northmen, which perhaps they had never heard of, and it has probably been added on Reinel's map after 1500, but without a name, just as Verrazano has it here. At that time Greenland was supposed to be connected with Europe, and this *Terra laboratoris* of our map is a Mapmaker's attempt, and perhaps a successful one, to locate the land from which Cortereal took his slaves in 1501. The true position of the coasts seen by the Cortereal's remains a problem, which can only be solved by the discovery of further documentary evidence. Jerome was not well informed when he attributes the discovery of this land to the English. He was perhaps endeavoring in this instance, to bring in the shadowy discoveries of Sebastian Cabot.

This completes our sketch of the Verrazano map of the World, which we regret to have been unable to decipher more completely owing to the imperfect copies of it at our disposal.

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* The French *Morrhue* has a different root, although it is synonymous with *Molue*.

XXXVIII.—CHARTS AFTER VERRAZANO.

Dr. I. G. Kohl in the first part of his History of the discovery of the East Coast of North America, &c., published by the Maine Historical Society in 1869, Chapter VIII, treats of the voyage of Verrazano in much detail, and gives notes on several charts which seem, as respects the East coast of the United States, to have been based on one drawn by that navigator. He had not however been able to procure a copy of the one seen in Rome by Mons. Thomassy, which he regrets, while mentioning it in a note at page 290. His remarks on Maps which probably were in part constructed from it, are so full that we can add but little to them, although he had not the advantage of being able to consult the original.

We must observe however that we cannot find one chart made after 1524, on which our coast is represented as on the one before us. The only feature which Mapmakers seem to have noticed and copied was the Western sea separated by an isthmus from the Atlantic. The coast however that he explored was always copied from Spanish charts containing the surveys of Gomez and others, which appear to have been spread over Europe shortly after they were prepared. The Spanish Maps remained the sole authority for the outlines of our coast from Florida to Nova Scotia until the English in 1583 began their settlements in Virginia.

Jacques Cartier and Jean Alfonse must have prepared charts, now lost, but the Gulf of St. Lawrence and Newfoundland were represented correctly soon after their explorations. They were perhaps less ambitious than Verrazano, and did not construct a Map of the World in order to show their own limited explorations. Had our navigator left a chart of his own discoveries only, it would have perhaps attracted more attention among geographers.

Most of the charts after 1524 which show the Western sea, call it Mar de Verrazano and the land is sometimes called *Verrazana*, but after 1583 his name disappears from every chart. One of the last of this kind was made by Michael Locke in 1582. (See Hakluyt's Divers Voyages 1582. Rep. by Hakluyt Soc. 1850.)

It is noteworthy that the narrow isthmus which is said, on the

chart before us to be only five leagues wide, was never sought for by any other explorer. It was a *strait* that was desired, one that all nations could navigate and that would shorten the way to Cathay and the Moluccas.

The first published Map containing traces of Verrazano's explorations is in the Ptolemy of Basle 1530, which appeared four years before the French renewed their attempts at American exploration. It shows the Western sea without a name, and the land North of it is called *Francisca.*

In Bordone's Isolario of 1528, fol. vi, verso, is seen a map with a sea west of Labrador, with a strait at the height of the Azores leading into it, probably all guess-work.

Several geographers and chartographers such as Ruscelli and Agnese, show the Western sea on their Maps, and Dr. Kohl carefully enumerates those he has met with, but the most interesting document of the kind is probably the copper globe of Euphrosynus Ulpianus of 1542, found by the late Buckingham Smith in Italy, and now in the possession of the New York Historical Society. It contains the only allusion to Verrazano's discovery recorded on a Map, previous to the publication of the letter in Ramusius of 1556. The earliest notice of the voyage as marked elsewhere, is in the account of Norumbega of 1539, supposed to have been written by Crignon.

Mr. Smith in his Inquiry, &c., read before the New York Historical Society in October, 1864, mentions this globe, and gives a copy of the part that contains the North American coast. An inspection of this portion of the globe will at once show that the author had seen neither the letter of 1524 nor the chart of 1529. He must have learned of the discovery elsewhere and from a source unknown to us. He represents the Western sea, nameless, and North of it appears the legend "*Verrazana sive Nova Gallia a Verrazano, Florentino, comperta anne sal M. D.*" There is an unfilled blank after the date, proving that the author had not seen the letter of 1524. Of the names along the coast there are some which may date from Verrazano's voyage, but as the photographs before us contain no legible names we cannot venture to assert their identity. The names "*Go de S. Germano* and *Lungavilla,*" (St. Germain and Longueville) on the globe, are decidedly French and we believe appear on no other Maps.

Normanvilla may be a translation of Norumbega, and if so is interesting as being its first mention on a map.

The chart of 1529 was probably preserved in England or on the Continent for some years, and was then inspected by geographers, but no close copy of it appears to have been made. About the middle of the 16th century it seems to have disappeared, having probably been sent to Rome, where it has lain dormant and unnoticed for three centuries, until noticed by Mons. Thomassy in 1852. Had it remained open to public examination Verrazano's name would have not required our tardy recognition of his exploit as an explorer. We must however thank the preservers of this chart for having rescued it from the fate that has befallen so many charts, valueless when a few years old, but which would be almost priceless now. Perhaps the charts of Columbus may be stored somewhere in like manner and yet be discovered.

XXXIX.—NEW FRANCE, OF VERRAZANO.

In the letter of 1524, Verrazano does not propose any name for the land he had discovered, but on the Mapamundi of 1529, by Hieronimus, we find it inscribed NOVA GALLIA sive IVCATANET, from Florida or the shore of the supposed Western sea to the Terra des Bretons. This name must have been, therefore, proposed by Giovanni, and the name *Yucatanet* was, perhaps, added by the mapmaker, though without any apparent reason, for the land of Grijalva is represented as doubtfully insular, and with its right name, *Yucatan*. He also has Nueva Hispania properly placed.

The Spaniards never recognized this name, but carried their *Florida* up to lat. 45°, which was officially declared to be the limit of Spanish territory by Philip the Second. It will be remembered that the name *America* was also not recognized by them until a very recent date.

Crignon, in 1539, had not seen Verrazano's chart, but says that many navigators, and even the Portuguese, call this Terra Française. Jean Alphonse, who coasted South to Massachusetts Bay

about 1542, says, in his *Routtier*, that these lands may well be called *New France*. Ramusius, in 1553, calls it *Nova Gallia*, and Ribault, in 1562, called it New France. Father Biard, in 1614–16, is of the opinion that Verrazan was the godfather of this name. Rocols, in 1660, (Descript. du Monde, 3me partie, Tom. V, p. 27,) explicitly says that Jean Verrazan gave this name to it.

On many maps after 1530, it was designated as *Verrazana*, or as *Nova Gallia* and *Francisca*, the name New France being finally restricted to the lands first explored by Jacques Cartier, although *he* did not apply that name to them. The Mapmakers, who had followed the draughts of the discoverer, did not hesitate to place the name where it was first imposed, while historians, with the letter of 1524 only before them, were in doubt as to the origin and proper application of the name.

XL.—JACOPO GASTALDI, 1548.

There was published at Venice in 1548 an octavo edition of Ptolemy, in Italian, containing modern additions, taken from Sebastian Munster, and newly designed maps prepared by Jacopo Gastaldi, the well-known mapmaker. Among these, the one entitled *Tierra Nueva*, representing the coast from Labrador to Florida, is from a draught entirely different from any previously published. The materials for it were probably derived from Ramusius, who had collected original maps to illustrate his collection of voyages, but who published very few of them. In this particular map we find indication of Portuguese and French tracings, with but little from Spanish ones. Labrador, confounded with Greenland, stretches far to the East; Newfoundland is divided into Islands, as in the Map of Sebastian Cabot of 1544 (which, however, Gastaldi does not appear to have used), and from Cape Breton to C. de S. Maria, the tracing appears to be a combination of Thomas Aubert's and Verrazano's charts. We cannot here further analyze this map, which has been well described by Mr. Kohl (Maine, p. 225 and 233), though he copies

it from Ruscelli's Ptolemy of 1561, not having seen the earlier edition of 1548, which he, however, quotes in a foot note.

The only point to which we wish here to draw attention is, that perhaps an attempt has been made to lay down Verrazano's *Luisia*, which is misspelt *Brisa*, and is placed not far from Cape Breton. It is doubtful whether the other portions of the coast to the S. W. are from Verrazano's explorations. They appear rather to be from the sketches of Jean Alfonse. Had he seen Verrazano's chart he could not have omitted, as he does, all mention of him in his text.

MERCATOR, 1569.

Gerard Mercator (or Kremer), the great reformer of Chartography, in his Planisphere of 1569, first named the island off the coast *Claudia*, being confused in his historical data, and this error was copied by Hakluyt and others. Mercator also commits, in his legends, the mistake of making him sail from Dieppe March 17, 1524. Ribault led him into this error.

XLI.—RAMUSIUS.

Extract from the 3d vol. of the collection of Voyages by Ramusius. First edition. Venice, 1556.

Fol. 417. Discourse on the mainland of the West Indies, called the land of Labrador, of Bacchalaos and of New France.

There sailed also along the said land in the year 1524, a great Captain of the most Christian King France, called John da Verrazano of Florence, and he ran the whole coast unto Florida, as by one of his letters written to the said King may be seen more particularly, the only one we could procure, because the others were destroyed during the sack of the poor City of Florence, and in the last voyage which he made, having landed with some companions, they were all killed by those people, and in the presence of those who remained on the ship, they were roasted and eaten. This unfortunate end befell this worthy gentleman, who if this death had not prevented, with the great knowledge and understanding which he had of marine matters, and of the art of navigation, combined and favored by the great liberality

of the King Francis, would have discovered and made known to the world, all that part of the earth unto the Arctic pole, and he would have not been satisfied with the sea only, but would have tried to penetrate farther into the land and as far as he could have gone, and many who knew him and conversed with him, have told me that he had determined to persuade the most Christian King to send to those parts a good number of people to settle in some points of the said coast, which are of a temperate climate, and with a most fertile soil and very fine rivers, and harbors that can hold any fleets. Much good might be done to the inhabitants of these places such as turning these poor rough and ignorant people to the worship of God and to our most holy faith, and to show them how to cultivate the earth, taking the animals of our Europe to those spacious tracts, and lastly with time we shall have discovered the inland countries, and if among so many islands as there be there, whether any passage exists to the South sea, or if the mainland of the Florida of the West Indies continues unto the pole. This and many other things were said to have been alluded to by this valiant gentleman, of whose works and efforts we have wished to publish this little that has reached us, that the remembrance of him should not be buried or his name be forgotten.

XLII.—ADMIRAL CHABOT AND VERRAZANO.

Fontette MS. XXI, 770, fol. 60. National Library, Paris.

We translate the agreement given by Mons. Margry, with some abridgment.

"Philippe Chabot, Baron d'Apremont, Chevalier de l'ordre du Roy, son Gouverneur et lieutenant General de Bourgoingue, Admiral de France et de Bretaine.

"Has determined to fit out two french gallions now in Havre de Grace, together with a ship belonging to Jehan Ango of Dieppe of about seventy tons, for the voyage of the spices to the Indies.

"Have concluded with those below to put in a sum of twenty thousand livres tournois, *i. e.*, we, the Admiral, four thousand;

Master Guillaume Preudhomme, general of Normandy, two thousand; Pierre Despinolles, one thousand; Jehan Ango, two thousand; Jacques Boursier, the same; Messire Jehan de Varesam, principal pilot, the same. The above sums amounting together to twenty thousand livres [which is not so, but perhaps the value of the ships made up the rest].

"The Admiral and Ango are to furnish the ships, with tackle and armament complete, and to have one-quarter of all merchandise brought home in return. The moneys above to pay for victualling, venture and wages.

"The said Messire Jehan, pilot, to furnish two other competent pilots for the other two ships, and to receive for himself and the two pilots, one-sixth of the merchandise brought in, after one-quarter has been taken out as above.

"Should any of the above ships be lost or not be able to sail, the apportionment to hold good as above, and the ship not sailing to participate at the rate of a mark to the livre.

"And should any prize be made at sea from the Moors or other enemies of the Faith and of the King, Monsieur l'Admiral will take a prior part of said prize of one-tenth, and the rest of the proceeds of said prize will be divided like the other merchandise, excepting such part of it as may be apportioned to the partners as agreed upon.

"And the Sieur Admiral will procure letters patent to license and expedite the said voyage, and that no obstacle shall be put in the way by any allied friendly or confederate nation of the King our Lord."

[Endorsed] "For the voyage of Messire Joan."

XLIII.—OVIEDO ON THE ENGLISH VOYAGE OF 1527.

Oviedo. Historia general de las Indias. Sevilla, 1535. Book 19, cap. 12, fol. 161. Academy edition, Madrid, 1851, vol. 1, p. 611.

Of certain stranger corsairs that have passed to those parts and the Indies, and what happened to them for their evil designs.

In the year 1527* an English corsair, under the pretence that

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* *Ramusius*, Vol. III, fol. 204, has copied this date erroneously as 1517.

he had gone out on discovery, came with a great ship, returning from Brazil* on the coast of Tierra Firme, and from thence he crossed to this Island Espanola, and came near the mouth of the port of this City of Santo Domingo. He sent his boat full of men and sought license to come in there, saying that he came with merchandise and for traffic. At this moment, the Alcalde, Francisco de Tapia,† ordered a blank charge to be fired from the Castle at the ship, which was coming right into port. When the English saw this they retired outside, and those in the boat embarked and went back to their ship.

In truth the Alcalde committed an error in what he did, because if the ship had entered, it would not have gone out again against the will of the City and the Castle. Thus seeing the manner in which they were received, they took the direction of the Island of Sant Juan, and entering the bay of Sant German, they spoke to the people of that city, &c.

XLIV.—HERRERA ON THE VOYAGE OF 1527.

Herrera, Historia general de los hechos de los Castellanos en las Islas y Tierra Firme del Mar Oceano. Madrid, 1601. Decada II, Libro V, Cap. III.

(The following extract is placed in the Spanish work, under the year 1519, but in Navarro's own manuscript,‡ as we were informed by the late Buckingham Smith, the date of the report is, St. Juan, November 19th, 1527. We know also, from Oviedo, that this is the correct one.)

Cap. III. Of an English ship, which came to the Indies; and of the state in which the Islands were.

The ships which carried the gold, the pearls and the common merchandise having sailed, a caravel of Santo Domingo being in

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*The account in Herrera, that the ship had come from Newfoundland, seems to be the correct one.

† Tapia died in January, 1533, and Oviedo himself was appointed as his successor, holding the appointment until 1554, though several times crossing the Ocean to Spain. In 1549 he became also Regidor of St. Domingo City; resigned his office 1556, returned home and died in 1557, aged 79.

‡ Entitled "A copy of a letter authorized by Domo. Cavallero, escrivano of the Audiencia of Espanola," &c., &c. MS. in Seville.

the Island of San Juan, loading with Cacabi [Cassava], there came in a ship of three top sails of the burthen of two hundred and fifty tons. The master of the caravel went to her in his boat, believing that she was a Spanish ship. He discovered a pinnace with twenty-five men armed with breast-plates, cross-bows and bows, with two pieces of Artillery in the bow. They said they were English, and that the ship was from England, and that this and another one had been fitted out to go and seek for the land of the Great Khan,* and that they had been parted in a storm. That this ship, pursuing her voyage, they got into a frozen sea, and found great islands of ice. That having taken another course, they got into a different warm sea, that boiled like water in a caldron, and that to avoid having the pitch melted, they went to make the Bacallaos (Newfoundland), where they found fifty ships, Spanish, French and Portuguese, fishing, and that they wished to land, to speak to the Indians, and they killed the Pilot, who was a Piedmontese. That from thence they had coasted to the Rio de Chicora. That from that river they had crossed to the Island of St. John.

And asking them what they sought in these Islands, they said that they desired to see them, to give an account of them to the King of England, and load up with Brazil wood. They requested the master of the Caravel, who was named Ginez Navarro, that he would come on board their ship, and that he would show them the route to Santo Domingo. He saw in the ship a quantity of wine, flour and other victuals and many cloths, linen, with many other articles for traffic. They carried much artillery, and a forge, and had ship-carpenters, and an oven to make bread, and there might be sixty men. The said Ginez Navarro said further that the Captain of this ship wanted to show him the Instructions he carried from the King of England, if he could have read them, and that at the Island of Mona, they put men ashore, and in the Island of St. John they trafficked some tin. This ship went to

* When Gilbert was fitted out with two barks of forty and thirty tons each in 1608, to search for a passage, where Hudson, in 1610, discovered the Straits that bears his name, there is a charge in the outfit of £6 13s. 4d. to Mr. Seger for writing her Majesty's letter to the Emperor of China and Cathay. Columbus, as we know, was always provided with a similar letter, and died in the belief that he had reached Asia only.

the port of Santo Domingo, and sent a boat ashore, saying that the traffic was desired, and it stayed there two days. The Alcalde of the Castle, sent on its arrival to ask the Auditors that they should give him orders what to do, and because they did not answer, he fired a piece of cannon against the ship; after which it hastened to get its boat back, and soon went away, and returned to the Island of St. John, where it lingered a short time trafficking with the people of the City of San German, and was not seen again. The Auditors, saying that the Alcalde ought to have waited their answer, arrested him, and informed the King of the case, and of the bad state of the fortress, in order that in its fortification some system should be followed, and that orders should be given to supply it with men, artillery and ammunition.*

This English ship † led to much thought, because, until then, not one from that nation had been seen in those parts, and therefore the King, as well as those in the Island, were anxious about it. The King would have desired that another course had been followed in Santo Domingo, and that the ship ought to have been taken by force or by cunning, because it was held as a perilous matter that the French, who already caused so much damage in Spain, ‡ should have begun to find the way to the Indies. On this account it was considered what remedy could be used against the inconvenience of having that nation § learn the way of navigating to the Indies.

As for the imprisoned Alcalde, the King ordered the Auditors to release him, that he might assist in the fortress, and that in his case they should proceed by a trial and let him know what they determined. If other ships should come to the Island, they were always to have an interview with them, and keep them guarded so that they might not escape, as this one had done. At the very least, they should seize the crew, or a part of it, or make such demonstrations, even of the most severe kind, that they would take care not to come again.

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* Navarro's report ends here. The rest is by Herrera from other sources.

† Finding her way to the Islands.

‡ This is an allusion to Verrazano and the French corsairs.

§ The Spaniards at that time feared the French more than the English. Within a quarter of a century they were to suffer in their own seas of the West Indies from Buccaneers of both nationalities.

Further, because of the number of French Corsairs who frequented the coast of Andalusia, and it became necessary to guard it, the Count of Osorno Asistente de Sevilla, was ordered to fit out a fleet of five or six ships, and that it should be arranged that the (Casa de) Contratacion should assist in the expense of it, as it was done for its protection. Artillery was to be borrowed to arm the ships from the Dukes of Medina Sidonia and Arcos, and from the Marquesses of Tarifa and Ajamonte.

XLV.—HAKLUYT ON RUT'S VOYAGE OF 1527.

Hakluyt (Divers Voy., 1582) says that Robert Thorne's letter written from Seville in 1527,* to Henry the Eighth, led to the fitting out of two vessels on discovery westward, which sailed, according to the Chronicle of Hall and Grafton, May 20th of the same year from London, but this, as Mr. Biddle remarks, could hardly have been received in time to influence the despatch of this expedition. He adds nothing concerning the results obtained, but in his work of 1589, p. 517, he had gleaned from Sir Martin Frobisher and Richard Allen, a few facts, but could not learn the name of the commander, and that one of the ships was called the Dominus Vobiscum, which was not correct. He also heard that a learned Canon of St. Pauls, a mathematician, took part in fitting out the expedition and accompanied it, that one of the vessels was lost near Labrador, and that the other had coasted along Cape Breton and Norumbega and got home in the beginning of October.

In his great work, Vol. III, 1600, p. 129, the same statement is repeated, with the regret as before, that no writer had preserved a record of the voyage.

Curiously enough, at page 499 of the same volume, he quotes Oviedo's account of the English voyage of 1527, from Ramusius, and assuming the erroneous date 1517 for it, supposes that this expedition was commanded by Sebastian Cabot.

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* From a note in Hakluyt, 1600, Vol. III, p. 500, we learn that he had a ledger, once belonging to Nicolas Thorne the elder, in Bristol, and that he found evidence in it to show that in 1526, this Thorne had sent a certain Thomas Tison (Tyson) to reside and traffic in the West Indies.

XLVI.—TIRABOSCHI.

The first edition of the "Storia della Letteratura Italiana, antica e moderna; del. Cav. Abate Girolamo Tiraboschi," appeared first at Mantua, 1771–82, in 13 vols. in 4to. We could not verify our reference by consulting this edition, but have copied it from Vol. VII, part 1, p. 260, of the Florence edition of 1819.

After speaking of Verrazano's earlier career, and referring to the notice in the "Elogi degl' illustri Toscani. Tom. 2, No. 30," and giving a brief sketch of his voyage of 1524, he says: "Nella libreria Strozziana in Firenze, oltre la Relazione sopraccenata, conservasi manoscritta una Narrazione cosmographica assai benedistesa di tutti i paesi ch'egli avea in quel viaggio osservati, e da essa raccogliesi ch'egli ancora avea formate il disegno di tentar per quei mari il passagio all' Indie orientali."

He then mentions the uncertainty hanging over his fate, and gives the reference to the letter of Annibale Caro of 1539, which he first discovered.

XLVII.—CARLI'S LETTER.

Archivo Storico Italiano ossia raccolta di opere e documenti finora inediti o divenuti rarissimi risguardanti la Storia d' Italia. Appendice. Tomo IX. Firenze. Gio. Pietro Vieusseux, direttore-editore al suo Gabinetto Scientifico Letterario, 1853.

Letter of Fernando Carli to his Father.

In the name of God.

4th day of August, 1524.

Honored Father.—Remembering that when I was in the Barbary fleet at Garbieh,* the news which were daily given you from the illustrious Sig. Don Hugo de Moncada,† captain-general

* Charles had been outbidding Francis for the Imperial Crown, and in order to signalize himself, he prepared in 1519, an expedition against the Barbary powers.

† Hugo de Moncada, Viceroy of Sicily, sailed April 15, 1520, with 6,400 infantry, 320 light horsemen and 560 men-at-arms, besides officers and volunteers, on 56 vessels for Garbich, an Island between the Damietta and Rosetta mouths of the Nile, and gained a signal victory there in June. See Documentos Ineditos para la Hist. de Esp. Vols. 23, 24.

of his Imperial Majesty in those barbarous parts, while pursuing and fighting the Moors of that Island, it appears pleased many of our patrons and friends, and that you were congratulated by them on the victory achieved; so, there are news again, recently received here of the arrival of the Captain Giovanni da Verrazzano, our Florentine, at the port of Dieppe, in Normandy, with his ship, the Delfina, with which, at the end of January last, he went from the Canary Islands (Madeira) in search of new countries for this most serene crown of France, displaying great and very noble courage by engaging as he did in an unknown navigation with a single sail, hardly a caravel of ——— tons, having only fifty men, with the purpose, to the best of his ability, of discovering Cathay by taking the way through climates different from those in which the Portuguese are accustomed to make discoveries toward Calicut; but going toward the Northwest and the North, holding on his way so as to find some country or other. Although Ptolemy, Aristotle and other cosmographers laid down, that no land was to be found in the direction of such climates; and thus by God has he been permitted to do, as he distinctly describes in a letter to this sacred Majesty, a copy of which is inclosed in this. After many months spent in navigation, he was obliged, as he states, for want of provisions, to return from that hemisphere to this, having been seven months on the voyage, indicating a very great and rapid passage made in the performance of an admirable and extraordinary feat, to the mind of those who understand the navigation of the globe. The commencement of that voyage was marked with disaster, and many thought that there never would be news of him, or of the ship; that it must be lost about the height of Norway, by reason of the huge ice in that Northern ocean; but, as that Moor said, the great God, to give us every day more evidences of his infinite power, and to show us how admirable in this earthly machine, has discovered to him an extent of land, as you will observe, so vast, that according to the good reasons and degrees by elevation of latitude, it appears and shows itself to be larger than Europe, Africa, and a part of Asia; *ergo mundus novus:* and this is without what the Spaniards have these many years found in the West; for it is hardly a year since Ferrando Magaghiana [Magalhaens] having discovered an immense coun-

try, returned in one ship of five with which he went out, bringing back cloves that are much better than common; and of his other ships in five years no news has been heard. They are supposed to be lost. What our captain brought, he does not mention in his letter, except a young man of those countries made captive, but it is believed that he has brought a specimen of gold, in that region of no value, of drugs and other aromatic liquors, to confer with many merchants here, after having been in the presence of his Most Serene Majesty, where he should be at this hour; and from there to come here soon, for he is much desired for his conversation, the more because he will see his Majesty, our Sire, who is expecting to arrive within three or four days;* and we hope that his Majesty will once more give him half a dozen good vessels to make the voyage again. And if our Francisco Carli shall have returned from Cairo, be assured he will adventure himself with him on said voyage, and I believe they knew each other at Cairo, where he was some years since and not only in Egypt and Soria [Syria] but nearly throughout the known world; and therefore on account of his merit, he is esteemed another Amerigo Vespucci, another Ferrando Magaghiana and even more; and we hope that by providing himself with other good ships and vessels well built and victualled as requisite, he will find some profitable traffic and business; and he will do, our Lord sending him life, honor to our country by acquiring immortal fame and memory. And Alderotto Brunelleschi, who went with him, and unfortunately turned back, unwilling to follow him farther, when he there hears of it will not be well pleased. Nothing else now occurs to me; since by others I have advised you of what is doing. I commend myself to you continually, praying you to mention me to our friends, not forgetting Pierfrancesco Dagaghiano,† who being a studious person does not idle much time, and to him recommend me; also to Rustichi, who will not be displeased (if he should take delight as formerly) in hearing of matters concerning cosmography. May God guard you from all evil.

Your Son,

FERNANDO CARLI,

in Lyons.

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* See also, Doc. Ined, vol. 23. † Perhaps Gagliano.

XLVIII.—JEAN ALFONSE.

Jean Alfonse de Saintonge, the pilot of Roberval, who was in Canada, 1542–1543, and who appears to have sailed along our Coast about that time, left a manuscript cosmography, completed in 1545, which is in the Nat. Library, Paris (MSS. f. fr. 676), in which no mention is made of Verrazano's voyage, 18 years before his own, nor does he appear to have had a knowledge of any early charts of the coast. The confused sketches of the coast which accompany the MS. are in detached sections (perhaps not of his own compiling), from Nova Scotia to Florida. Editions of his work, under the title of "Voyages avantureux du Capitaine Jean Alfonce, Saintongeois," appeared in 1559, about twelve years after his death, and again in 1578 and 1598. The published work, however, is not as full as the MS., which is deeply interesting to American students, in those parts that profess to describe our coasts. Although a portion of his printed work is given by Hakluyt (Voyages, Vol. III, 1600, fol. 239), it seems never to have occurred to any one that he ought to be considered as an explorer of our coast, until Mons. Margry, in "Navigations Francaises," &c., Paris, 1867, p. 323, drew attention to the passage (also given by Hakluyt), in which he distinctly avers that he had entered a bay in lat. 42°. The Rev. B. F. De Costa has treated this subject in detail in his "Northmen in Maine, 1870."

We believe that neither Mess. Leon Guerin, Davesac or Margry, who have noticed this experienced navigator, were aware of the mode of his death. We may therefore be excused for drawing attention to the following account of it, and also because Verrazano's fate may have been somewhat similar, and perhaps now lies recorded in some document not hitherto consulted.

The poet, Melin de Saint Gelais, in the verses which accompany the first edition of the "Voyages avantureux," of 1559, refers vaguely to some passages in the life of this forgotten pilot and corsair, and says of his death:

> "La mort aussi n'a point craint son effroy,
> Ses gros canons, ses darts, son feu, sa fouldre,
> Mais l'assaillant l'a mis en tel desroy
> Que rien de luy ne reste plus que poudre."

We quote these lines from Harrisse's "Notes sur la Nouvelle France, Paris, 1872," p. 8, who adds that Alphonse appeared to have been killed in a naval combat, which must have taken place before the 7th of March, 1547, the date of the Imprimatur of the edition of 1559, which contains the verses of Saint Gelais.

Barcia, Ensayo cronologico para la Historia General de la Florida. Madrid, 1723, fol. 58.

"This and other like deeds brought him [Menendez] into such credit that in the following year he was ordered by the Emperor Maximilian,* who then governed in Spain, to go against Juan Alphonso, the Portuguese † (who was called the Frenchman by the Spaniards), a Corsair, who had taken, near Cape St. Vincent, 10 or 12 Biscayan vessels, loaded with iron, iron work and other valuable merchandise. He had hardly received the order, when he proceeded straight to the coast of Brittany and to La Rochelle, recaptured five of the vessels taken, and entering with one near the reef of La Rochelle, where he anchored, he fought with Juan Alphonso, and wounded him; and when he wished to go out by the way he came in, he could not, having wind and tide against him. The magistrate of the Port ordered him to land; which he did, showing his commission, and giving the reasons for taking those prizes which they had made, breaking the peace. But the magistrate would not let them go; placing them in deposit (depositolas), so that those interested would seek to recover them. Not being able to do otherwise, he obtained certificates, sending one to the Emperor Charles the Fifth, who was in Flanders, and the other he took himself.

Juan Alphonso died of his wounds, and his son, Antonio Alphonso, was so indignant about it, that, with his patrimony, he inherited the art of piracy of his father, and sent to defy Pedro Menendez, notifying him that he should put to sea after two months, and he did so, with three ships, very good ones. He sailed towards the Indies, where he learned that Menendez was

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* Barcia is mistaken here. This Maximilian was the eldest son of Ferdinand of Austria, and his wife was the Princess Mary, daughter of the Emperor. The Emperor left Spain in 1540, and his son Philip left it in 1548.

† He was certainly a Frenchman, from Saintonge, near Cognac, but had been in the Portuguese service, and was familiar with the navigation to Brazil. Barcia, p. 24, mentions him as *Alonzo (gallego o Portugues)*.

going. He went to await him at Teneriffe, and there attacked two ships to capture them, but a ball from the Spaniards cut him to pieces, sinking the ship afterwards; and shortly after that Pedro Menendez took the two others."

Pedro Menendez de Aviles was born 1519. Took to the sea when quite young, distinguished himself, was made Adelantado of Florida, and died aged 55, in Biscay, when just about to lead the Great Armada of three hundred sail, against the English. It is said that he had made over fifty voyages to the Indies.

XLIX.—BUCKINGHAM SMITH'S NOTICES OF VERRAZANO'S VOYAGE.

The late Buckingham Smith of St. Augustine, Florida, was deeply interested in all that related to the early discovery, exploration and settlement of his native State. He printed several documents from the Spanish Archives bearing on this subject, and also annotated the narratives of De Soto and Cabeza de Vaca, but in such limited editions that they are not generally known.

He left some manuscripts, copied in Spain, a selection from which may at some future time be edited and published by those who have charge of them. Among these were some documents or notes relating to the supposed death of Verrazano at the hands of the Spaniards.

Mr. Smith, in his zeal to establish the claims of the Spaniards to the discovery of our coasts, was wont to discredit all that interfered with them, and thus endeavored to prove that the voyage of 1524 by Verrazano, was a fiction. He first expressed this theory in a paper read before the New York Historical Society, October 4th, 1864, followed by a resumé of it in the Historical Magazine for June, 1865.

We met soon afterwards, when he was shown, as confirming the voyage of 1524, the almost cotemporary statement of Crignon, as given by Estancelin, and the notice of the Mapamundi of 1529, discovered by M. Thomassy in Rome. He gave a translation of this last notice in the Historical Magazine for October,

1866, but mistook the sense of the Italian words *carta pecora*, supposing they meant *small Map*, and expressed no confidence in the Map as a document confirming the letter.

Soon afterwards he read the agreement between Admiral Chabot and Verrazano, given by Mons. Margry in his *Navigations Francaises*, and gave it translated, in the Historical Magazine for January, 1869, with some prefatory remarks which we quote here.

"The following draft for a Charter party, with promise of the approbation of Francis I., for a voyage to India, was discovered in the Bibliotheque Imperiale, and first published last year, in the original, by M. Pierre Margry, in his work, *Les Navigations Francaises du XIVe au XVIe, Siecle.* The enterprise contemplated, as may be seen by reference to the volumes of Francisco d'Andrade, *Cronica do Muyto alto e muyto podiroso Rey destes Reynos de Portugal Don Joas a III deste nome*, printed at Lisbon, in 1613, was to form a settlement in Brazil, and was defeated in France by the Portuguese Minister, Silveyra, in whose time, we read, a period of nine years, from 1523, during his continuance at Paris, no other attempt appears to have been made from France, at a voyage of like character.

The author of *Les Navigations* observes that this Document could not have been drawn up earlier than 1526, the year in which Cabot received the office of Admiral and the Government of Burgundy, in recompense of his services in delivering the King from the prisons of Charles V. The date is subsequent to that of the Letter of Verrazzano, 1524, giving account of his discovery of the Northeast coast of America, and proves the assertion of some Spanish writers not to have been exact, that his execution took place in that year.—B. S."

We cannot here attempt to refute or criticise Mr. Smith's doubts more fully than we have done, in the course of the above paper and notes. His opinions, when analyzing early Spanish narratives, are of great weight, but he paid little attention to the early French or English ones, which did not interest him.

The following are his published notices on Verrazano:

The globe of Euphrosynus Ulpianus, 1542. Historical Magazine, 1862, p. 202.

An Inquiry into the authenticity of documents concerning a

discovery in North America, claimed to have been made by Verrazano. Read before the New York Historical Society, Tuesday, October 4th, 1864. By Buckingham Smith, New York, 1864 (8° pp. 31, with copy of part of the globe of 1542). Contains quotations from Caro's, and the whole of Carli's letter.

Verrazano as a discoverer. Hist. Mag., 1865, pp. 169, 175. (Contains a review of his Inquiry, &c.)

Remarks on Mr. Smith's paper on Magallanes and Gomez. (By Mr. Smith.) Hist. Mag., 1866, p. 230.

Map of the World, containing the discovery of Verrazano, drawn by Hieronimus de Verrazano. Hist. Mag., 1866, pp. 299–300. Contains only Thomassy's notice of the Map.

Verrazano. (Charter party for a voyage to India, &c., with prefatory remarks.) Hist. Mag., 1869, p. 28.

L.—J. G. KOHL ON VERRAZANO'S VOYAGE.

No critical examination of Verrazano's voyage along our coast had been attempted by a geographer until Dr. J. G. Kohl, in his interesting "History of the Discovery of Maine," in 1869, gave it especial attention. He had not seen the chart by Hieronimus (see op. cit. p. 290, note), or his opinions would have been materially changed. The absence, in the letter, of any definite description of our coast (which description was probably minutely given in the "*little book*," alluded to), makes it impossible to trace Verrazano's exploration with certainty.

Dr. Kohl is also disposed to accept Verrazano's claim to have coasted from lat. 34 deg. to 50 deg. We have shown that his landfall could not have been South of lat. 39 deg. 05 min., as he had been swept North by the Gulf stream (whose history Dr. Kohl has published), and that the chart shows no geographical features which could permit any other assumption. It must be remembered that no correct observation could be taken at that time on board ship, and his landings were too hurried to permit the setting up of his larger instruments, so that the only reliable observation was the one taken in Newport harbor, where he tarried for a fortnight.

Pl. II.

Dr. Kohl, as others have done before him, by assuming the landfall to have been in lat. 34 deg. has, of course, to make the landings of the explorer fall so much more to the South of the points where we place them. This has always prevented a proper understanding of the letter. We shall not, therefore, undertake to correct Dr. Kohl, who, with others, agrees upon Newport harbor as the place where Verrazano stayed two weeks.

Dr. Kohl has not observed that in at least two places, that is in the paragraphs we have numbered as 9 and 14, the writer of the letter repeats himself, thus leading one to suppose that he had coasted more than was really the case.

His observation that the people of the more northerly lands visited by Verrazano, were acquainted with the use of iron, and opposed to the landing of strangers, is ascribed to its true cause, the visits to their coasts by fishing vessels.

The voyage of Gomez, in 1525, and Rut's expedition of 1527, are also carefully treated by Dr. Kohl, who deserves the thanks of all American students for the many geographical memoirs he has published.

IV.

PHYSICAL GEOGRAPHY OF THE NORTH-WESTERN BOUNDARY OF THE UNITED STATES.

By George Gibbs.

WITH TWELVE ILLUSTRATIONS.

READ NOVEMBER 11TH, 1869.

Geology of the Coast Region—Changes of Elevation.

Dr. Newberry, who has carefully studied the geology of the Sierra Nevada, the Cascades, and the Coast range, both in California and Oregon, has arrived at the following conclusions: That, in the earlier stages of elevation of the continent, the Sierra Nevada and the Cascades of Oregon formed its western limit, and that long before the elevation of the Californian and Willamette valleys, or of the Coast mountains, the ocean broke against their sides; that this was the case prior to the tertiary epoch, as no rocks so recent as the tertiary are found upon their summits, or high up on their flanks; but that, as the elevation of the continent and of these ranges progressed, the rocks of the miocene were deposited, the edges of which rest against their base; that the upheaval of the Coast range was still subsequent, those mountains being formed by the protrusion of igneous rocks through the miocene, which yet partially crowns and skirts them on either side; that the elevation proceeded until the glacial epoch, during which the great erosions of the valleys, the

straits, and river bottoms, as well as of the northern fiords, took place, after which a subsidence commenced, when the drift was deposited; and that finally a new upheaval commenced, and is still progressing.

These deductions are fully borne out by the facts collected in Washington Territory. From the Columbia, at the mouth of the Cowlitz, tertiary sandstones line the basin included between the Coast and Cascade ranges, as far as Bellingham Bay on the east and Port Townshend on the west, and have been traced consecutively along the Pacific, from the mouth of the Columbia to Cape Flattery, and through the southern shore of the Strait of Fuca. These rocks are almost everywhere greatly disturbed by intrusions of trap, and, except along the edges, are covered with drift. They abound in coal, of which seams of various thicknesses have been found in many localities. None of the earlier stratified rocks have as yet been detected below the tertiary, upon the mainland of Washington Territory; but the occurrence of cretaceous and carboniferous fossils elsewhere in the neighborhood will presently be mentioned.

Lower Columbia River.

The features of the country on the Lower Columbia have been described by Mr. Dana in the Geology of the Exploring Expedition, and by Dr. Newberry and myself in the Pacific Railroad Reports,* and little can now be added to the facts there stated. The estuary of the Columbia River extends to Cathlamet Point, about twenty-five miles from Cape Disappointment. Its greatest width is seven miles. Much of this space is occupied by sand, the deposit of its freshets, and these extend to some distance seaward outside of the heads, forming the dangerous obstructions to its entrance. During the freshets, which commence about the middle

* P. R. R. Reports, vol. i and vi.

of May and continue till near the end of July, immense quantities of this deposit are brought down. The bulk in each gallon of water is perceptible, and so vast is the flood, that the water on the bar is drinkable at low tide. The northern point of the entrance, known as Cape Hancock or Disappointment, is a precipitous, rocky bluff, connected with the main by a strip of land elevated but slightly above the sea, which divides the Columbia from Shoalwater Bay. The southern, Point Adams, is of sand, and forms the extremity of the so-called Clatsop Plains. These are rather a series of parallel valleys, inclosed between ridges of sand, which extend from the mouth of the river to Tillamooks Head. The extensive sheets of water, north of the Columbia, known as Shoalwater Bay and Gray's Harbor, resemble the estuary of that river, in their general character. Both are protected from the sea by shelter beaches, probably formed in great measure from the matter swept down by the waters of the Columbia, and are in great part silted up by deposits of sand and mud.

At Astoria the sandstones and shales of the tertiary are intersected by dikes of basalt, and a similar dike occurs on Shoalwater Bay. Fossils, ascribed by Mr. Conrad to the miocene, are common, chiefly occurring in calcareous nodules washed from the banks. They comprise cetacean bones, fish, mollusks, echini, and one species of abies.* Above Astoria the rocks exposed on both shores of the river are chiefly basalt, and basaltic conglomerate in horizontal beds, and interstratified. The basalt is generally compact, and in places assumes columnar and nodular forms, though less distinctly so than east of the Cascades.

The conglomerates vary greatly in composition from tufaceous and pebbly rocks to one imbedding large fragments of basalt. Mr. Dana has shown that they are

* Geology Expl. Exp., App., p. 722.

sometimes interstratified with, and even merge into, the tertiary sandstones.

Cowlitz and Chihalis Basin.

Leaving the Columbia for Puget Sound, the rocks bordering the Cowlitz and Upper Chihalis are again tertiary, interrupted as before by dikes of basalt, which become, however, less extensive and frequent. Several outcrops of coal occur in the neighborhood. One seam of eight feet in thickness was recently discovered upon a creek emptying into the Columbia below the Cowlitz. On the Cowlitz River, near the landing, and again about half a mile above the upper forks, are others. Upon the "Skookum Chuck," an easterly branch of the Chihalis, still another seam was opened some years ago, but the coal, though abundant, proved of inferior quality. The exact limits of this formation, owing to the broken and heavily-timbered face of the country, have nowhere been defined. It undoubtedly extends west, with interruptions of basalt, through the Willopa hills to Shoalwater Bay and Gray's Harbor; but its eastern border does not probably reach beyond the foot hills of the Cascade range. As in the Willamette valley, it has evidently been much denuded.

The soil on the Cowlitz River, where the face of the country is not too broken for agricultural purposes, is among the richest in the territory, consisting of a light sandy loam of great depth, with interrupted beds of clay, wet and excessively tenacious like those of the Willamette. On reaching the Skookum Chuck, a series of gravelly prairies intervenes, which extends along the eastern side of the sound to beyond Steilacoom. On the Lower Chihalis and Gray's Harbor, and upon the streams entering Shoalwater Bay, tracts of great fertility again occur.

been effected by sub-aërial denudation, at a period when the continent was more elevated than at present, perhaps assisted by glacial action. The probable co-operation of this latter agency is strengthened by the existence of glaciers in some of the northern fiords, where even now they come down to the sea.

Governor Simpson, in his "Overland Journey," speaking of Wrangel's Strait and Prince Frederick's Sound, says: "The valleys were lined with glaciers down to the water's edge, and the pieces that had broken off during the season filled the canals and straits with fields and masses of ice, through which the vessel could scarcely force her way."

The fiords have a remarkable parallelism among themselves, but run diagonally to the course of the mountain-chains, and to those valleys which occupy their interior troughs, pursuing, in fact, the direction which the drainage of the mountains would assume in seeking the ocean. The exemption of the north-eastern coast of Vancouver's Island from these erosions, I presume, arises from the fact that the watershed is nearest it.

VANCOUVER'S ISLAND.

The interior of Vancouver's Island is comparatively little known. It is mountainous, and, besides being deeply indented on the coast-side, abounds in interior lakes. The mountains rise apparently to an equal altitude with those of the Olympic peninsula, of which they are a continuation; and are probably of the same constituents, or with a greater prevalence of granitic rocks. Around Victoria, at the south-eastern end, are sienite, greenstone, and serpentine; and at Esquimalt is also a limestone similar to that of San Juan Island. Among the boulders of Nanaimo River and Mill Creek, sienite, greenstone, and porphyries were common. Many of the rocks in place at Victoria are striated by glacial action, and sienite boulders of large size are scattered over the

MOUND PRAIRIES.

The gravelly prairies between the Skookum Chuck and Olympia are characterized by the occurrence, in great number, of small elevations, which have given to them the descriptive name of the mound prairies. They occur elsewhere, but more sparingly in different parts of the country; always, so far as my observation has extended, in gravelly deposits, and in such situations as may be supposed to have been lake bottoms, for I presume those upon the hills, above the Dalles of the Columbia, to be of a different character, as they are different in size and shape. The prairies upon which these mounds occur lie upon both the Chihalis and the Tenalquet, the former emptying into Gray's Harbor on the Pacific, the latter into Budd's Inlet, an arm of Puget Sound, their valleys being separated by low, rolling hills. There is every evidence of their having once been lakes. The hills bordering them exhibit sloping banks, such as generally surround tranquil waters, and upon several there are more or less distinct lacustrine terraces.

So strongly, indeed, do they suggest this origin, that the Indian legends tell of their being dried up by supernatural means. A noticeable feature among all of them is, that the ground is rather lower around their edges, or immediately under their banks, than in the centre, as is the case sometimes with marshes.

The first prairie of the series is that known as Ford's, situated on the north bank of the Skookum Chuck, and here the mounds are first observable. On this tract they are low, and not sufficiently numerous to attract particular attention. It is nearly a dead level, and raised but little above the freshets of the Chihalis. At Luark's, along the edge of the woods, on the east side, numerous "oak stubs" grow on small hillocks, which seem to have been raised partly by their droppings, partly from the pushing up of the soil by their accumulated roots; but these are not to be classed with the true mounds. On the

THE GRAND MOUND.

"Grand Mound prairie," there are low, scattered mounds between Cooper's and Goodell's, the most distinct being those nearest the woods. What is called the "Grand Mound" itself, is an isolated hill about sixty feet in height, on which are a number of oaks and large firs. Its most gradual slope is to the north-west. No rock is visible on any part of it, but there is a spring on one side, about two-thirds of the way up. It is, of course, entirely distinct from the mounds in question, though its form has doubtless been modified by water. Around and to the north of the Grand Mound the lesser ones are very indistinct; but through the middle of the prairie they become more numerous and better defined. They seem most so, however, near the edge of the prairie, at least on the south-east side, where the road passes, and toward the eastern end they are well developed. They are generally covered with fern, denoting a better soil than that of the prairie level, which is very gravelly and poor. Boulder stones begin here to be common, between the mounds. Crossing "Scatter Creek," a stream which wanders over the level of the prairie, often during the dry season disappearing and rising again; the next, called the "Long prairie," is pretty well covered with mounds. It is more unequal in elevation than the last; and at the eastern end there is a terraced ridge in the middle, about twenty-five feet high, having a steep bank to the south. On this there are some few mounds of an exceptionally large size, the highest, about fifteen feet, having been the site of an Indian house, or perhaps Kamass cellar, several holes being excavated in the summit. The ground is here very stony, the boulders being sienite, trap, green-stone and trap conglomerate. The ordinary mounds are pretty distinct, say four or five feet high.

On Hodgden's prairie the mounds are obscure. A terraced ridge runs through its middle, and there are a great many boulders of a foot or eighteen inches diameter

scattered through it. At Hennesey's a well of fifteen feet was dug entirely through boulder stone, no walling being required. The little "Round prairie" beyond is more sandy than gravelly, and quite free from mounds. The two prairies on Black River, known as Baker's and the Mimee prairie, I did not visit, but received satisfactory information from others respecting them. On the first, the mounds are comparatively few and low. The southern end of Mimee prairie is said to be terraced with but few mounds; the northern end thickly covered with mounds about six feet high. The country on Black River is in great part swamp, caused by beaver dams.

The most remarkable development of this formation, however, is on Rabbison's or "Stony prairie," which lies on the Tenalquet. Nearly the whole extent is so thickly studded with mounds, that the bases touch one another. The average height is six feet, and they are generally twenty-five or thirty feet in diameter, being sections of a sphere. Quite a number of them have been opened from curiosity, and in every case with the same result. They are composed of a light soil, with interspersed gravel, being perfectly homogeneous through the whole mass. I caused one of them to be trenched down to the level of the prairie. There was no appearance of stratification. The soil and gravel were equally intermixed throughout. This prairie is of generally uniform level, though with some swales running across it, and the intervals between the mounds are, as it were, paved with boulder stones; the appearance presented being as if the superficial soil, down to this bed, had been shovelled up into piles. The mounds are covered with grass and fern, the intervals, as mentioned, being stony, barren, and destitute of vegetation. Beyond this prairie they extend a short distance into the woods, a fact which I have observed nowhere else. They have, however, no resemblance to the hillocks caused by fallen timber. "Bush's prairie" is sandy, and exhibits few or no traces of

mounds, so far as I noticed. The above constitute the district of the mound prairies proper, but there are also traces on some of those lying between Olympia and the Nisqually River, and on parts of the Nisqually or Steilacoom Plains. These are generally low and indistinct, but characterized by the same superiority of soil.

Captain (now Admiral) Wilkes, in his journal of the United States Exploring Expedition, speaks of the "Butte prairies" as covered with tumuli, or small mounds, at regular distances asunder, conical in form, about thirty feet in diameter at the base, and six or seven above the general level. He opened some of them, but found nothing except a pavement of round stones. They seemed to him to be grouped in fives (thus ⁝⁝), and, he remarks, had evidently been constructed successively, and at an interval of several years, and were formed by scraping the surface-soil together.

Among the various theories respecting their origin, I had met with none that appear to me satisfactory. Capt. Wilkes, as shown above, is decidedly of opinion that they are of artificial, and, inferentially, human, construction. To this there are many objections, however. The Indians themselves have no tradition of their origin, and clearly do not recognize any marks of human labor, or they would doubtless have referred them to the ancient or demon race, whose handiwork is apparent in everything anterior to their own traditional recollection. The solution which occurred to the minds of those of whom I inquired was that they were made, like the waves of the sea, by winds. That they are not properly tumuli is apparent from the fact that they contain no bones or relics of any kind, or evidences of fire. Their number also contradicts the supposition, as does likewise the other fact, that there are none conspicuous above the rest, which would have been the case with the graves of chiefs. Except for sepulchral purposes, I can conceive no object in their construction. There is no trace of design in

their arrangement, no distinguishable features or relative position. In frequent rides through the prairies, I have looked carefully, but in vain, for a disposition in quincunxes, and called the attention of others to the point, without ever succeeding in detecting it. Neither could I see any marks of labor upon them, beyond the fact that their material was homogeneous. As regards succession or interval in construction, the only possible evidence that can exist is that, in some prairies and parts of prairies, they are larger than elsewhere. As respects the pavement, it bears no evidence of artifice. It is simply the substratum of the whole district, the mass of underlying boulder of the drift.

Farther: the mounds cover so great an area that a population much larger than could have been subsisted in the country would have been required to construct them, unless a great length of time were occupied; and the process would, at least temporarily, have destroyed the only land from which subsistence could be derived. Now, it would be contrary to all experience of Indian character to persist for generations in heaping up these piles unless for purposes of burial, which they clearly are not; defence they never could have been applied to. Again, they seem to be confined to the gravelly and stony prairies, and those where sand or light soil prevails are generally, if not entirely, free from them. If they had been the work of Indians, the easiest ground would naturally have been selected. Among other speculations, one is that they are the product of denudation, or rather that the mounds themselves have been protected by vegetation, such as fern, bushes, etc., while the intervals have been washed away. I examined particularly whether there was any arrangement in reference to drainage, but found that there were no continuous lines, nor any such slopes as would admit of this explanation. Only in one or two swales did the mounds seem to me parallel to the general course. Usually they are as numerous in these

hollows as on higher ground. As to the protection afforded by bushes, it is very certain that clumps of the scrub oak do surmount small hillocks on the skirts of the wood; but, on the other hand, the mounds proper are too large and too equidistant to admit of this explanation.

Again, they have been attributed to the pushing up of the soil by the roots of the wild cucumber vine (Megarrhiza Oregona), which frequently reach the size of a half barrel, and are very commonly found in them, or that these have at least formed a nucleus about which the soil has collected. But, independent of the fact that these roots are only occasionally thus found, and that they as often grow in level ground, it is much more probable that the vine has here obtained the soil requisite for its growth. That they are not the remains of a burned or overturned forest is clear from comparison with the ground beneath existing woods, where large trees have been overthrown. The piles of earth and rock upturned with the roots always, of course, leave a corresponding depression.

There is again no indication that they are the work of burrowing animals. They exhibit no depressions where holes can have existed, nor, as before remarked, do they contain bones, or evidences of occupation. Instead of being thrown up from within, the mounds have been clearly piled up from without.

Finally, it has been surmised that they are thrown up by springs, at the bottom of the lakes. To this, the same objections of regularity of size and uniformity of distance may be offered, while there are still greater ones, in the equal distribution of gravel through the mass, and the light and open quality of the soil.

To Mr. Agassiz is due the only explanation consistent with all the facts. On exhibiting to him the drawings and description of the mounds, he unhesitatingly declared them to be the work of fish of the sucker family, accumulated in successive years during the lake period, for

the protection of their eggs. A similar process, he states, is going on in Jamaica pond and other little lakes around Boston, and that on a scale which causes no wonder at the size of those of Washington Territory.

In accepting his views, I have thought that their full force could but be given by presenting the facts relating to the mounds, and the various speculations and objections that have occurred to myself and others, notwithstanding their prolixity. As to the era of their formation, it must be of a date geologically modern. It was long subsequent to the deposit of the drift, because a large amount of organic (vegetable) matter has entered into the soil of which they in part consist.

DRIFT OF PUGET SOUND.

The basin of Puget Sound consists, as already described, of slightly-rolling table land, intersected in various directions by deep canals and bays. The whole of this plateau country, extending on the eastern shore from the gravelly prairies of the Chihalis to Burrard Inlet, in about lat. 49° 20′, taking in the peninsula between Admiralty Inlet and Hood's Canal, Whidbey Island, and a strip bordering the southern shore of the Strait of Fuca as far as Observatory Point, is one vast mass of modified drift, almost unbroken by the occurrence of rock in place. From this, however, is to be excepted the group of islands lying between the Strait of Haro and Bellingham Bay, which will be hereafter described. The height of the deposit above the sea level exceeds 300 feet, and, judging from the character of the bottom in the included canals, its depth below that point is in places still greater. Burrard inlet forms the dividing line between the drift and the mountain country which, beyond it, comes down to the water. It will therefore be noted that the inlets of Puget Sound differ from those north of Burrard in this, that the former are excavations in the deposited drift, while the latter are proper fiords.

The general constituents of this drift formation are sand, or rolled stone, and gravel of different sizes, mixed with sand and interstratified with beds of clay; the latter usually occupying a low position in the exposed cliffs. There is some variety in the lithological character of the pebbles in different parts of the sound, trachyte and volcanic tuff or grit being more abundant in the drift at the upper or southern end than lower down, and sandstone predominating both on the Strait of Fuca and in Bellingham Bay—facts consistent with the idea of neighboring derivation. For the rest, a great variety of plutonic and metamorphic rocks, identical with those of the Northern Cascade range, the Olympic group and Vancouver's Island, form the mass of detritus. It is observable that micaceous rocks are almost wanting, and that soda takes the place of potash feldspars. The stratification is sometimes quite distinct, and for the most part horizontal. The sections presented by the bluffs indicate that the unevenness of surface is generally due, not to subsidence or upheaval, but to partial denudation, the lines running out where the ground slopes away. These lines are, it is true, not always continuous, but, after extending some distance, often rise or drop suddenly a few yards, and again resume their former altitude. A very good instance of this may be seen on the western shore of Whidbey Island, opposite Port Townshend. The horizontality is, of course, not universal. In some parts of the sound local subsidences have taken place, which cause a sag, creating an intermediate valley. In others, fractured strata are observable, arising from the same cause. The bluffs are almost always abraded on their water-faces, either by the undermining of waves, or by the wash of rains, which often bring down slides of earth and trees, and their steepness depends in great measure upon the adherence of their constituents. On the inside of Protection Island, however, and near Point Partridge, on Whidbey Island, as also at several points farther up the

sound, faces occur with regular slopes, and covered with vegetation, which have not been destroyed by recent modification. The prairie country around Steilacoom, or between the Nisqually and Puyallup rivers, forms a series of levels, rising in well-marked terraces, which not only border the intervals of water-courses running toward the sound, but face the sound itself. Similar terraces are observable at other points, as near Port Townshend.

I have observed no mollusks in the drift above the sea-level, but beds of infusorial earths occur in various places. These were submitted to the examination of Mr. Edwards, whose report upon them is appended. Very unexpectedly, they prove to be of fresh-water origin; the late Professor Bailey having arrived at the general conclusion, from the specimens examined by him, that all those deposits from the country west of the Sierra Nevada and Cascade range would prove to be of marine, as those from the east are of fresh-water, origin. So far as California is concerned, this seems yet to be true; but the earths from Puget Sound appear, on the contrary, to be fresh-water also. Some specimens from Simiahmoo Bay, on the forty-ninth parallel, which are of more recent character, may be supposed to be the deposit of the creek at that place; but others from Port Ludlow and Colseed Bay, and from the banks of the Skookum Chuck, are properly fossil. As I obtained these from other persons, and did not see them in place, I am unable to assign their geological position. The clays, interstratified with the drift, according to Mr. Edwards, do not contain infusoria. In this connection it may be noticed that most, if not all, of the streams which head in the volcanic peaks of the Cascade range are ladened in their freshets with earthy matter, and that these deposits may possibly consist of vapillæ, which it is known are frequently infusorial.

Below the sea-level the borings of two Artesian-wells at Port Gamble afford a means of determining the char-

acter of the deposits to a depth of 230 feet. A section with specimens was furnished me by Mr. Henry C. Wilson, of Toekalet, as follows:

1st.	Quicksand	65 feet.
2d.	Small boulders	10 "
3d.	Cement of gravel, sand, iron, and clay	20 "
4th.	Blue clay	25 "
5th.	Quicksand containing water and gas	10 "
6th.	Blue clay	100 "

In the last stratum, as in those above, were found pieces of decayed wood and shells. Unfortunately, the specimen sent did not exhibit any of them. The gas is said to be carburetted hydrogen, and to burn with a white light.

Elephantine remains have been discovered in the swampy land overlying the drift. Near Port Townshend two large fragments of tusks were ploughed up; and Dr. Kennerly, of the Survey, obtained another fragment from New Dungeness. Dr. J. G. Cooper also obtained pieces of teeth near Penn's Cove on Whidbey Island. Thin seams of lignite occur in various places, as along the eastern side of Whidbey Island, and at what is commonly called Volcano Point, on Admiralty Inlet. At this place, a seam about twenty feet from the top of the bluff has for many years been on fire, spontaneous combustion having probably taken place from decomposing pyrites, as it is most active during the rainy season.

No general order can be given of the stratification of the bluffs, which varies everywhere; but the following will serve as examples:

Strait of Fuca, near New Dungeness.

4.	Sand and gravel, in beds covered with slides, say	100 feet
3.	Stratified blue clay	3½ "
2.	Brownish clay, impure, with some oxide of iron	3 "
1.	Gravel and sand, coarse	3 "
	Beach of rolled pebbles.	

Point Wilson, Strait of Fuca.

5. Sand and gravel stratified, but chiefly compact sand, say	100	feet.
4. Vegetable matter	2	"
3. Sand	6	"
2. Vegetable matter	2	"
1. Blue clay, containing vegetable traces and imbedded fragments of wood	4	"
Beach of rolled pebbles.		

This section extends for some hundred yards along the shore. The vegetable matter is in a highly compressed bed, running nearly horizontally, of very even thickness, and in almost every stage of carbonization. The upper seam is less regular, thinning out to the westward to four inches. The wood is apparently spruce. One stump, found imbedded in the sand, was about six inches thick and four feet long. It seemed somewhat compressed, but the wood was nearly unchanged. In this seam was found a blue earth, identified by the analysis of Dr. Wolcott Gibbs as phosphate of peroxide of iron, which occurred in small masses imbedded in the sand, and also with the wood. It was noticed only at this locality. At Point Roberts the bluff on the inside, or bay, is, by estimate, about 200 feet high. It consists chiefly of sand, stratified with small gravel, and colored in places with iron. Interstratified with this are seams, a foot or so in thickness, of fine clay. Where intermixed with sand, the latter sometimes segregates itself, showing a disposition to concrete in rounded masses. According to my observation, boulders of large size are seldom seen imbedded in the bluff, although very common at its foot, and sparsely distributed over the surface of the country, indicating a transportation more recent than the deposit of the general mass of drift. Sienite is the most common material of these blocks. Pudding-stone and a hard gray quartzite occur, though less frequently. Some

of the boulders on the beach between Seguina Bay and Port Townshend were from twelve to fifteen feet in length, and one in the woods between Fort Steilacoom and the Puyallup is of still greater dimensions.

As might be expected from the general prevalence of these gravelly deposits, the Puget Sound district presents but a limited amount of arable land. The strictly alluvial tracts are, however, of great fertility, and the roots and smaller grains are of fine quality and very productive.

Tertiary of Puget Sound.

The tertiary rocks of Puget Sound have not been merely tilted by the elevation of the Coast range, but greatly dislocated on the side of the Cascades by local eruptions. It would seem, likewise, that a general subsidence has taken place in this basin, and in the Gulf of Georgia, as it is very unlikely that so extensive a depression should be due to erosion alone, where protected from the encroachment of the sea by an exterior wall. In fact, that local oscillations have occurred in the northern coast, not extending to Oregon and California, is highly probable. The gap in the outer line of islands, between Vancouver's and the Queen Charlotte group, and that known as Dixon's entrance, independent of the chasm between those islands and the mainland, can hardly be ascribed to any less powerful causes.

Outcrops of tertiary rocks occur along the edges of the drift on either side of the basin, but rarely protrude through it. The coal or lignite in which they abound appears also in various places; as on the Skokomish River, a stream emptying into Hood's Canal; on the Nooskope, a branch of the Dwamish or White River; on the outlet of Dwamish Lake; upon Bainbridge Island, opposite the village of Seattle, and on the Stolukwhamish. The only place where any working has been carried on is at Bellingham Bay, and it is there that the

tertiary rocks are most extensively exposed. No lime stone has been observed among them, and none of the calcareo-argillaceous concretions common at Astoria and other southern tertiary localities. The sandstones and conglomerate, or rather grit, line the eastern shore of the bay for some eight or ten miles, extending back eastward to Whatcom and Samish lakes. The trend of the bay is north and south; the apparent strike of the rock about east and west; and the dip, where any is visible, is to the north, at various and generally very great angles. It is, therefore, evident that foldings and dislocations have taken place here to an extraordinary extent. The measurements made by Lieut. Trowbridge, United States Engineers, published by Prof. W. P. Blake in the fifth volume P. R. R. Reports, comprised but a small portion of the entire shore, and even in that distance exhibited unmistakable foldings. He found, in a section of only 2,000 feet, seams of coal amounting to 110 feet in aggregate thickness. It is true that in this portion the greatest number of beds occur, but others are found some miles below, having the same direction, and it is probable that even here they are duplicated. The examination that I made of the shore line was a very superficial one, conducted chiefly in a canoe, and the results are far less satisfactory than could be wished; but the confusion of these rocks is such that a much more careful study might fail to disentangle it.

Three seams were opened some years ago; but, owing to various discouragements, among others the great importation of foreign coal into San Francisco, two of them were abandoned, and the other has but lately been worked to advantage. This is the mine of the "Bellingham Bay Coal Co." at Sehome, about half a mile below the village of Whatcom. The width of the seam here is fifteen or sixteen feet, the dip northward is 42°. The first drift carried in was horizontal, on a level about twenty feet above high-water mark. This was abandoned, and a shaft

sunk fifty feet below it, with an inclined plane, from which other drifts have been worked. The coal seems to be somewhat displaced, rising and falling, but without actual fault, and the bed has been traced back two miles to Whatcom Creek. The cover of the mine is a soft greenish sandstone or arenaceous rock, very similar to that imbedding some of the fossils at Nanaimo. The engineer in charge stated that there were five layers of coal separated by thin seams of fine clay, and differing somewhat in quality. Like all the lignites of the Pacific, it is bituminous. Dr. Newberry's analysis gives for its constituents, fixed carbon 47.63, bitumen 50.22. It exhibits a very clear fracture, and bright appearance when recently excavated, but does not bear exposure to the weather, like the older coals. It has been largely used on the sound by steamers, and considerable quantities have been shipped to San Francisco for the same purpose; but is, as may be supposed, very inferior to true coal, as it consumes with greater rapidity, and gives less actual heat, while the amount of ash is in excess.

Mr. Fitzhugh, the agent of the mine, informed me that at the outcrop he found cones and leaves of firs (probably taxodium) in the shale, but no other fossils. Some 400 feet down the slope, a slab of coal was taken out, some three or four feet square, having a distinct branch of fir with twigs and cones upon it; but it was, unfortunately, broken up by the miners. A very fine specimen of fossil resin or amber, forming a seam in the coal, is among the collections of the Survey.

Immediately in front of the mine, upon the beach, between high-water and low-water marks, are the upturned edges of a stratified sandstone, entirely unconformable to the rocks of the bank, as it dips westward under the bay at a moderate angle, and has a strike north and south It is noticeable in connection with the occurrence of a similar rock having the same strike, but with a much greater dip, in the small cove within Bellingham

Bay, known as Tchukanuts, some miles below, and cut off from the above by a projecting point of conglomerate. It then extends for about a quarter of a mile along the shore, dipping into the water at an angle of 60°. The first bench rises about 100 feet; thence the rock falls back for perhaps sixty yards, and again rises in another pitch.

The total height of the hill cannot be less than 800 feet. This sandstone, which is entirely different from the ordinary sand rock of Bellingham Bay in its perfect lamination, separates in layers of from six inches to two feet thick, with even faces, intersected by diagonal joints. Where the stone has not been weathered, it is of a bluish hue; where exposed to the atmosphere, it takes a drab color, and shows a disposition to concrete in rounded masses.

Whether this is, as the miners suppose, a continuation of the ledge opposite the coal-mine, I had no opportunity to ascertain. The rock has been used in the construction of the light-house at New Dungeness, and also for flagging at Fort Bellingham, and is by far the best building-stone upon the sound. The laminæ of the sandstone, on being detached, exhibit in a remarkable degree the penetrating power of vegetation, a network of fine root-fibres from the trees and bushes overhead having forced itself for many feet in depth between them. The fossil plants from Bellingham Bay have been described by Dr. Newberry in a separate report. They were obtained from two different localities by Dr. R. O. Craig, United States Army, and Mr. Roeder, of Whatcom. They confirm the opinion already entertained, that the age of these deposits corresponds with that of the lower miocene of Europe.

STRAIT OF FUCA.

The shores of the Strait of Fuca, on either side, present as unbroken a line as that of the coast southward, and

it would appear that a gap originally existed at this point in the upheaval of the coast-mountains, tertiary rocks, and the drift which usually overlies them being found on both sides of the strait, indicating that its erosion has been through those deposits only. On the southern shore the drift covers the tertiary as far as Observatory Point; and the bays of Port Townshend, Port Discovery, and Sequim are excavated in this material. Westward of this the conglomerates and sandstones are exposed, generally much disturbed, and in places broken through by trap, which is conspicuous in the headlands, having resisted the action of the water more successfully than the others. Of the conglomerate, numerous small islands and columns line the shore, and at Cape Flattery are conspicuous in detached needles, from 20 to 100 feet in height. I am indebted to the late superintendent of light-houses on the sound, for specimens and data respecting this neighborhood.

About half-way between Pillar Point and Clallam Bay, on the south side of the strait, a seam of coal has been opened directly in the face of the bluff, and a few feet above tide-water. The dip is to south-west about 40°, the strait running east and west. The thickness is but about four feet. There are others above it, but none more considerable. The coal, when first mined, has a clean appearance and a cleavage somewhat like the cannel, but speedily disintegrates with an efflorescence of copperas. It burns with a vivid flame, but, on experiment, proved of little or no value. The seam is underlaid by conglomerate and a greenish shale containing mollusca. The specimens obtained unfortunately crumbled to pieces, but there is little doubt that they belonged to the miocene. A specimen of hard gray sandstone containing a species of mactra was found loose on the shore of the strait near Port Discovery. Mr. Meek, to whom it was submitted for examination, is doubtful whether to consider it as cretaceous or tertiary,

though inclining to the opinion that it is of the latter age, in which belief the locality sustains him.

ARCHIPELAGO OF HARO.

The group of islands lying between the Canal de Haro and the mainland, including Fidalgo and Lummi Islands, consists almost entirely of erupted rocks, trap, and serpentine, bearing upon their sides altered slates and conglomerates. As in the case of the coast mountains, they have been thrust up through sedimentary strata, and remains of sandstone are yet visible, unaltered, though greatly dislocated, on their northern shores. Thus, the northern end of Lummi Island, the portion of Orcas which includes Point Thompson and Point Doughty, the whole of Waldron Island, and the small islands in the Canal de Haro are of sandstone and conglomerate, while the rest of Lummi and Orcas, and all the others, are of erupted or metamorphic rocks; a line drawn from a little above Point Francis, about W. S. W., to the Sannitch peninsula being that of separation Whether these sandstones belong to the tertiary, like those of Bellingham Bay, or to the cretaceous, like those of Nanaimo, and form the southern limit of that basin, no absolute conclusion was arrived at, the fossils collected being chiefly new; but Dr. Newberry, to whom they had been submitted, was inclined to the latter opinion, the more especially as the small islands known as the Lucia Group, a little to the north of Orcas Island, are undoubtedly cretaceous. It is noticeable that along the shores of these islands, slates, which in other parts of this district are rare, occur in abundance. They are greatly altered and contorted, and, in places, beds of several yards in thickness are included in the ejected rocks. These slates, I presume, are of older formation than the tertiary, and perhaps belong to the carboniferous era. Of the same age is, I suspect, the metamorphic limestone of San Juan Island, and that of Esquimalt, on Vancouver's Island. It

is well known that carboniferous rocks exist in the Sierra Nevada, and, although they have not yet been detected in the Cascades south of the forty-ninth parallel, there is reason to believe that the limestones and slates of the Chiloweynck, hereafter noticed, are of this age. Limestone is said to abound to the northward, on Malaspina Island, in the Gulf of Georgia, but of what character I have no information. The limestone of San Juan Island occurs in great abundance on its western side. It varies considerably in structure, from compact to crystalline, and is associated with an altered slate. In point of economical value it is of the highest importance, as no other locality of this material exists in this part of the territories of the United States. All the lime heretofore used on the Sound has been imported from San Francisco or Vancouver's Island. Dr. Kennerly, who visited the quarry, observed boulders which had been dug up from beneath the surface, planed and grooved as if by glacial action.

The only locality among these islands, excepting Lucia, at which fossils were obtained, was on the western side of Orcas, between Point Doughty and the Sannitch fishery. The rocks here consist of sandstones and conglomerates, with interstratified beds of shale, and have a dip to S. E., varying from 35° to 50°. The shales are of very considerable thickness, one bed being sixteen paces across. Vegetable impressions are numerous, and a few shells were also obtained, as also a fragment of a crustacean. The plants are described by Dr. Newberry, but the shells, unluckily, were lost or destroyed. A bed of coal was observed on the beach, beneath the sand, but, from want of tools, was not explored. It is said to be a very extensive one. Large quantities of petrified wood were also noticed. My visit here was made in a canoe, during a very stormy period of the winter, and was too much hurried to make any thorough examination. The Lucia Islands I was unable to reach, and for the speci-

mens collected from there I am indebted to Mr. P. C. West, of the United States Coast Survey. They consist of baculites, ammonites and inocerami, and were described in the report of Mr. Meek, who refers them to a newer member of the cretaceous than the beds of Nanaimo, or to that of No. 4 of the Nebraska series.

This archipelago, to which so much attention has been directed by the claim set up to it by Great Britain, is of considerable interest apart from its strategic importance. It consists of three principal islands, Orcas, Lopez, and San Juan, and of a number of smaller ones grouped around, and covering the several entrances. Within, the landlocked bays and passages afford sea-room for navies, their only fault being the inconvenient depth of water. Fisheries of the greatest productiveness occur along their shores, where the Indians, with their rude nets, catch an abundance of salmon. As regards agricultural advantages, San Juan is the most valuable, about one-third of its surface being arable land, and another fitted for pasture. Upon Lopez Island there is also a considerable tract suited for settlement. Orcas and some of the smaller ones are mountainous; Mount Constitution, on the former, reaching the height of 2,400 feet, and others, on Cypress, Fidalgo, and Lummi, ranging from 1,200 feet upward. The date of upheaval of these islands seems to have been contemporaneous with that of the coast range, or, at any rate, to have preceded the glacial epoch. Very well marked scratches and grooves are observable on the serpentine rocks at the south-eastern end of San Juan Island, apparently running from N. E. to S. W., and it may well have been that the interior basin was, during that period of elevation, filled with a mass of ice.

The terrace formation, which is of a later date, is not so remarkable among the islands as on the main. There are, however, two or three very well characterized terraced hills, one of which, on the inner shore of San Juan,

called Park Hill, is about 450 feet high. This is of sand and gravel, not cohesive, and a large part of the face has been excavated by water, and slid down. The southern face, which is free from timber, is terraced; but the lines are neither so distinct nor so horizontal as the other. A number of sienitic boulders are scattered over it, and lodged on the bare rocks beneath. It is evident, therefore, that their transportation was subsequent to the drift, and that they were brought from a distance is shown by the fact that no sienite exists on any part of this group. Floating ice, therefore, must have come down from the northward after the subsidence, during which the drift deposited took place. Similar hills front the Strait of Fuca, on the south-east end of the island. The terraces follow their curves in horizontal lines, the benches being narrow and somewhat sloping, the banks inclined about 30°. The easternmost is about 250 feet in height, with three benches or terraces, besides its flattened summit. A swale separates this from another to the west, declining, as well as the hills, most steeply northward, on which side, and its ridge, numerous boulders have also lodged. These, like the blocks on Park Hill, are of light-colored sienite, and some of them of great size. A circular excavation in the swale may have been formed by the grounding of an iceberg.

North-west Coast.

In contrast with the almost unbroken coast of Oregon and Washington Territory, that of British and Russian America, as already observed, is deeply indented with sounds, and complicated arms, or fiords, and the same is true of the western or Pacific shore of Vancouver's Island. Mr. Dana, in his Geology of the United States Exploring Expedition, first pointed out the restriction of this phenomenon to high latitudes, and its occurrence there upon both sides of the North American Continent, in Patagonia and Norway, and very forcibly reasoned that it must have

been effected by sub-aërial denudation, at a period when the continent was more elevated than at present, perhaps assisted by glacial action. The probable co-operation of this latter agency is strengthened by the existence of glaciers in some of the northern fiords, where even now they come down to the sea.

Governor Simpson, in his "Overland Journey," speaking of Wrangel's Strait and Prince Frederick's Sound, says: "The valleys were lined with glaciers down to the water's edge, and the pieces that had broken off during the season filled the canals and straits with fields and masses of ice, through which the vessel could scarcely force her way."

The fiords have a remarkable parallelism among themselves, but run diagonally to the course of the mountain-chains, and to those valleys which occupy their interior troughs, pursuing, in fact, the direction which the drainage of the mountains would assume in seeking the ocean. The exemption of the north-eastern coast of Vancouver's Island from these erosions, I presume, arises from the fact that the watershed is nearest it.

VANCOUVER'S ISLAND.

The interior of Vancouver's Island is comparatively little known. It is mountainous, and, besides being deeply indented on the coast-side, abounds in interior lakes. The mountains rise apparently to an equal altitude with those of the Olympic peninsula, of which they are a continuation; and are probably of the same constituents, or with a greater prevalence of granitic rocks. Around Victoria, at the south-eastern end, are sienite, greenstone, and serpentine; and at Esquimalt is also a limestone similar to that of San Juan Island. Among the boulders of Nanaimo River and Mill Creek, sienite, greenstone, and porphyries were common. Many of the rocks in place at Victoria are striated by glacial action, and sienite boulders of large size are scattered over the

VIEW ON ACTIVE PASSAGE, COWITCHIN ARCHIPELAGO.

ground. The grooves were north and south. Gold has been found on the island in small quantities, but so far has not repaid the search.

The soil about Victoria, off the immediate shore, is good, with a clay substratum, but it is confined to small valleys and glades, among the outcrops of rock. This portion of the island, the only part settled in 1859, in character of scenery, more nearly resembles the New England coast,—Rhode Island, for example,—except in the prevalence of timber, than any other section of the Pacific coast with which I am acquainted.

Cowitchin Archipelago.

The line of islands bordering the shore of Vancouver's, north-west of Orcas Island, which may be thus designated, together with a portion of the Sannitch peninsula and a strip of the main island, consists almost entirely of sedimentary rocks, sandstones, and conglomerates, with some shales, and but an occasional dike of trap. A cursory examination was made of these as far as Nanaimo.

The islands are high and broken, almost entirely of rock, with but a thin covering of soil, and the trees are stunted and unfit for timber.

The general dip is to N. N. E., or perpendicular to their trend, the upheaval being from the Vancouver side. Their inner walls are abrupt, and the included channels very deep. As regards the thickness of the formation, no definite conclusion was arrived at. A hill, which I ascended, on Galiano Island, was estimated at 1,000 to 1,200 feet; but if the one on Salt Spring Island is of the same materials throughout, it must reach twice that in elevation above the water. The rock on Galiano Island was a coarse conglomerate of rounded pebbles, underlaid near the water by sandstone. Conglomerates of this description, but varying in the size of the pebbles, are the predominating rock throughout. The sandstone is

generally in thick beds, and the shales, when they occur, are often several yards in thickness. I saw no indications of coal or any fossils.

NANAIMO COAL MINES.

This place is a small bay, on the eastern side of Van couver's Island, in latitude 49° 10′, longitude 123° 57′ W. It is the place marked Decanso on the old charts, a name given by the Spanish discovers, Galiano and Valdez; that of Nanaimo is the appellation of the Indian tribe inhabiting the vicinity.

It is here that the principal mining operations of the Hudson's Bay Company have been carried on. A considerable amount of coal has been got out, but the works have been conducted with but little system, and in great measure by Indian labor.

The coal lies in two seams; the upper, termed the Douglas seam, four feet six inches in thickness; the lower, called the Newcastle, six feet. Both are accessible, being exposed at different points by the inclination of the strata, and the local destruction of the rocks overlying the latter. The two seams have been worked; the upper at the village, and to the south of it; the lower, on the small island called Newcastle Island, and now, also, in the northern part of the village, where a shaft has been sunk to meet it.

This latter is considered rather the best coal, as well as the most abundant and easily worked. The rocks accompanying both seams are sandstone, and a pebbly conglomerate, with shales, and a soft, green sand-rock, containing fossil remains. The coal is bituminous, makes a great flame, and consumes rapidly, leaving much less ashes than that of Bellingham Bay, and, in place of a friable slag, deposits a black and very adhesive clinker. Although somewhat superior to the tertiary coal, it is yet, owing to its light weight and rapid combustion, estimated, as I am informed by Mr. Davis,

Assistant Engineer, United States Navy, as thirty-three per cent inferior to Welsh coal for steaming purposes. It is, however, used extensively on the neighboring waters, and also exclusively for the production of gas at Portland, Oregon, and at Victoria, in both of which places works have been erected. The gas burns with a very white light, and is more fluid than that produced from the true coals. The amount of gas manufactured from a ton of coal is 8,000 or 9,000 feet.

The limits of this field are not determined. The extent already explored is considerable, and, if properly worked, would furnish a large supply for a large number of years, even if it should not be found to extend beyond the immediate vicinity.

Douglas Seam.

A more detailed section of the rocks overlying the Douglas seam, on the same authority, is as follows: It is that of the Nanaimo mine.

	Feet.	Inches.
Arenaceous, laminated rock of a grayish color, containing a small proportion of argillaceous matter, with occasional irregular seams and nodules of limestone	25	10
Indurated brown shale	25	6
Conglomerate	0	6
Coal	0	6
Shale	11	6
Coal	0	6
Clay	2	6
Coal	0	9
Carboniferous shale	0	6
Coal, principal seam	4	6

Above the Douglas seam, at the present mine, Mr. Robinson states there are five fathoms of conglomerate, where not denuded, as ascertained by boring, over which there are sandstones and shales.

Where already worked, there appears to be of the last not over one fathom; but, nearer the shore, and probably interstratified with conglomerate, fifty fathoms.

There is no shale immediately over the coal. The dip of the bed at the village of Nanaimo is eastward, the angle varying from 25° inland to 45° near the shore; on Newcastle Island it is south and south-east, but these inclinations are apparently local, there being no uniformity for any distance.

The Douglas seam has not been worked at Newcastle Island, though a shaft was sunk to meet it. This was opened near the level of the water, and struck the coal at three fathoms. From appearances it would seem to be covered by sandstones and conglomerates to the thickness of thirty or forty fathoms at the southern end of the island.

On Douglas Island, near Newcastle, a seam somewhat thinner, and of still better quality, is said to have been found, which is supposed to be superior in position to the Douglas coal.

Newcastle Seam.

A shaft has very recently been sunk at the village, where there is a local denudation of the superior strata, striking the Newcastle seam at a depth of fifteen fathoms.

The rock was here chiefly conglomerate, fine and coarse, interstratified with sandstone. Of the latter, the seams were comparatively thin. The coal was four feet six inches in thickness, disposed as follows:

	Feet.	Inches.
Sandstone roof, with partings	2	0
Coal	1	3
Earthy	1	3
Coal	0	6
Shale	0	9
Coal	1	0
Shale	0	3
Coal	1	0

The most extensive work has been done on the western side of Newcastle Island, a drift of about 250 yards in length having been carried in, nearly east, with seven oblique taps, making in all about 1,000 yards. The dip here is south at an angle of 20°.

The northern outcrop of the coal is in a bluff, bordering a sort of valley or ravine, beyond which the island is made up of similar rocks, but greatly disturbed. The following is a section of the bluff, the thickness being estimated:

	Feet.
1. Conglomerate bedded	36
2. Sandstone disposed to concrete in rounded masses	48
3. Sandstone more regularly stratified	12
4. Sandstone compact	4
5. Coal	5
6. Covered with debris, but probably consisting of coarse conglomerate	40
Level of bay.	

It is from this mine that the largest amount of coal has been got out, perhaps 8,000 tons, but it has been abandoned in favor of the shaft at the village.

The principal difference between the rocks here and at the latter place is that the conglomerate is thinner, with fewer pebbles and better stratified

Fossils.

A few vegetable remains have been formed above the Douglas coal at Nanaimo village, which are said to have been similar in character to those below the Newcastle. I obtained two or three specimens, but they crumbled before they could be compared. On Newcastle Island, near the water's edge, and superior to both seams, vegetable impressions and shells, of which a number of specimens were collected, occur in shale; among the latter were Dosinia tennis, *Meek*, Pholadomya subelongata, *Meek*, and a species of Tancredia, the two former being

identical with the specimens obtained on Nanaimo River, in connection with an inoceramus.

The only fossils yet found between the two seams were, it is said, very small marine shells, resembling in form the common cockle, now found in these waters. I was not fortunate enough to obtain any of them.

Some vegetable impressions, including "aspidium Kennerbyi," Newberry, were obtained from the seam of clay, interstratified with the Newcastle coal, in the new shaft at Nanaimo village, the first instance of any being found *in* the coal.

They are numerous below that seam, and, where I examined, consisted for the most part, of ferns and a taxodium.

This place, which is a steep bank bordering the ravine behind the village, presents the following section, the heights being estimated.

	Feet.
1. Conglomerate	30
2. Coal dip 2.25, perhaps the Newcastle seam thinned out	1
3. Conglomerate	15
4. Greenish sand-rock containing plants	4
5. Conglomerate	10

Level of marsh covered at high tide.

On the north side of Mill Creek an opening has been made, near the foot of the high bluff, in a stratum of soft sand-rock, also containing vegetable remains. The impressions resemble those above the Douglas coal, on Newcastle Island. No shells were observed. The shale dips in the direction of the island, about N. E., at an angle of 20°. The relative position of this I could not determine. A salt-spring has been found on the border of this creek, and preparations were making to work it.

Newcastle Island bears marks of a recent elevation in the sandstone on the western side, which has been cut into holes and irregular cavities by water at a height several feet above the present tides, the edges and parti-

tions being very sharp and apparently new. The same excavations were noticed on the inside of Galiano Island.

Nanaimo River.

I ascended this stream for about two miles. The rock, in places where it was visible, along the banks, was sandstone and conglomerate, the prevalent dip being to the east, at various angles; but this direction was not uniform, there being frequent displacement. At the point mentioned, shells were found in the shale upon the right bank, principally Dosinia tennis, *Meek*, Pholadomya subelongata, *Meek*, and an inoceramus not sufficiently perfect to identify.

The river here ran east and west, and the strata dipped into it at an angle of 20°. It was impossible to obtain any satisfactory section, from the fact that the bank was mostly covered.

The bed of this stream is of sandstone, and its depth very irregular, being excavated here and there into deep holes. The rock, when near the surface, exhibited very good examples of the manner in which cavities of irregular and singular shapes are worn by the attrition of two or three stones, their channels running into one another.

From the above facts, it would seem that the entire group of Nanaimo rocks is cretaceous, at least so far as includes all the coal heretofore exposed.

Komooks Fossils.

The locality from which these were derived I do not know, except that it is some distance to the north-west of Nanaimo. They have, I believe, been brought down only by Indians, who find the calcareous nodules, in which they are contained, washed out from clayey banks. The specimens in the collection of the survey were presented by Mr. Robinson, to whom I am also indebted for various others from Nanaimo, and for many of the above facts. The genera obtained from this locality, including

also some in the Smithsonian collection, embrace arca, inoceramus, cardium, dentalium, baculites, helioceras, ammonites (four species, of which one is identical with a Lucia Island ammonite) and nautilus.

BEAVER HARBOR.

At Beaver Harbor, near the eastern extremity of Vancouver's Island, an extensive bed of surface-coal was formerly worked by the Hudson's Bay Company, who thence procured the fuel for their trading steamer. I have seen no fossils from there, and have no information as to its probable age.

The existence of cretaceous rocks on Vancouver's Island was, I believe, first made known by Mr. Meek, in a paper read before the Albany Institute in 1856, and published early in 1857,* based upon specimens received through Dr. Newberry, from the Smithsonian Institution. The collection, as rightly conjectured by Mr. Meek, was derived from two different members of the formation, though both were described as from Nanaimo. I have, however, very little doubt that those contained in the argillo-calcareous concretions were from Komooks, and only those found in the brown or greenish sandstone from the Nanaimo beds. Mr. Meek's first impression was, as appears in the paper referred to, that all were cretaceous, though as to the latter he expressed some hesitation. Subsequently he was inclined to the view that the Nanaimo fossils might be Inrassic, and so stated to Dr. Newberry in a letter quoted by him in his report to Lieut. Williamson. On receiving, in 1858, the specimens forwarded by me, in which the plants of Nanaimo were found associated with inoceramus, goniomya, etc., both these gentlemen agreed in the conclusion that the formation at that locality also was cretaceous. The equivalent to the Komooks beds, to which is now added those of

* Transactions Alb. Inst., vol iv.

Lucia, was recognized by Mr. Meek in 1856, as to be found in No. 4 of the Nebraska series, described by himself and Prof. Hall,* and in other papers by himself and Dr. Hayden, and believed to be synchronous with the white chalk of the Old World.

The Nanaimo sandstone fossils he considers as older in the series. It is noticeable that the plants of this locality are of types believed by many to be no older than the tertiary.

Queen Charlotte Islands.

But few notices of the geology of the northern coast appear in any work to which I have had access. The Queen Charlotte Islands, which are represented on the ordinary charts as a single island, form in reality a group, and, as before stated, are, like Vancouver's, a continuation of the Coast range. Very little is known of them, as the number and ferocity of the inhabitants have hitherto prevented any examination. As early as 1853, attempts were made to pursue the search for gold, which was found to exist there, but they resulted disastrously. It was found in quartz at Mitchell's Harbor, in lat. 52° 25′. Capt. Stuart, of the Hudson's Bay Co.'s service, informed me that specimens of antimony and arsenic, probably arsenical pyrites, were brought by the Indians, it was supposed from Kummeshaw, and that copper was found on the small island off Pt. Frederick.

The slate from which pipes, dishes, and ornamental articles are made by the natives, is, according to them, found near the canal separating the two largest islands, not far from Skittegets; and specimens of lead ore, black-lead and arsenic were reported as from the same neighborhood.

The north-east end of the group is said to be level and heavily timbered, with marshes and lakes interspersed.

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* Trans. Am. Acad. A. and S., vol. v.

Brown coal is found in several places, one on the north end, another on the east side; which renders probable the northerly extension of the tertiary rocks of California and Oregon.

SKAGIT RIVER.

This is the largest stream entering the sound, and the only one, between the Columbia and Frazer River, which cuts through the main range of the Cascades. It has its source in what I have called the Eastern Cascades, near that of the Similkamen, and the small stream entering Frazer River below Fort Hope.

In company with Mr. Grennan, of Utsaladdy, I ascended it in a canoe, at the end of July, 1858, as far as its exit from the cañon, about seventy-five miles above its mouth. The river was then in full freshet, and for a long distance a quarter of a mile wide, very deep and rapid. At its mouth is a delta of low alluvial land, intersected by numerous channels, and for some miles farther the banks are subject to overflow. A little above, where the mouths diverge, commences a series of rafts of drift-timber, three in number, and in the aggregate a mile and a half in length, immovably fixed and utterly stopping the navigation.

But for this obstruction, light-draught steamers could navigate it for a distance of nearly fifty miles. A large body of very rich land lies on the lower part of the river, much of which is, however, heavily timbered. About fifty miles up, a branch enters, having one of its sources in Mt. Baker, and ten miles beyond is the south fork, or Sakumihu, up which is an Indian trail to the Columbia by way of Lake Chelaun. Near the former, called the Hukullum, the river becomes narrowed, the hills setting in and rapids commencing, though there are still long stretches of smooth water.

The cañon of the Skagit, by which it passes through the Cascade range, is by report some eighteen or twenty

EXIT OF THE SKAGIT RIVER FROM THE CANON.

miles in length. Rapids and falls of some height occur in it. The scenery is exceedingly picturesque, the mountains rising directly from the river in abrupt and rugged forms, but covered with forests.

The general range of the mountains bordering the Skagit seemed to be from N. E. to S. W., not running in continuous chains, but attached parallel ridges placed in echelon. On the lower and middle parts of the river they exhibited long sweeping lines, with pretty steep declivities, say from 30° to 40°, and very generally capped with regular cones. Higher up they were more broken, and snow peaks were frequently visible.

One very remarkable mountain, called by the Indians Hugweht, apparently overhangs the water on the right bank, some miles above the Hukullum.

It was apparently of basaltic conglomerate. Mt. Baker is seen from only two or three points, and presents an entirely different form from that seen from the sound, its summit being roof-shaped, instead of pyramidal.

At the time of my visit, reports of the existence of gold on the Skagit, and the hope of finding a route to the Frazer-River mines, had led quite a number of persons to ascend it.

The color of gold was found in one or two places, but no favorable indications.

The height of the water was, however, an obstacle to any thorough prospecting. Bluffs of drift, overlaid with blue clay, occur at intervals along the river, corresponding to those on the sound, and in one of these I noticed, near the level of the water, a seam of ligneous matter, about a foot in thickness, having a slight easterly dip. The bluffs are sometimes 300 or 400 feet in height, and very uneven on the surface, but the general stratification is horizontal, or nearly so, and no great changes have taken place since their deposit.

The first rock in place occurs some twenty-five miles from the mouth, a little above the crowning of the pro-

posed military road to Bellingham Bay. It consists of argillaceous and mica slates, the latter with veins of quartz, very much tilted and often contorted, having a general strike of N. E. and S. W., in conformity with the apparent range of the hills.

In the bed of the Hukullum I obtained specimens of vanon, colored porphyritic trachytes and scoriæ, brought down from Mount Baker, and which may probably form the sharp and ragged spurs which break off from that mountain.

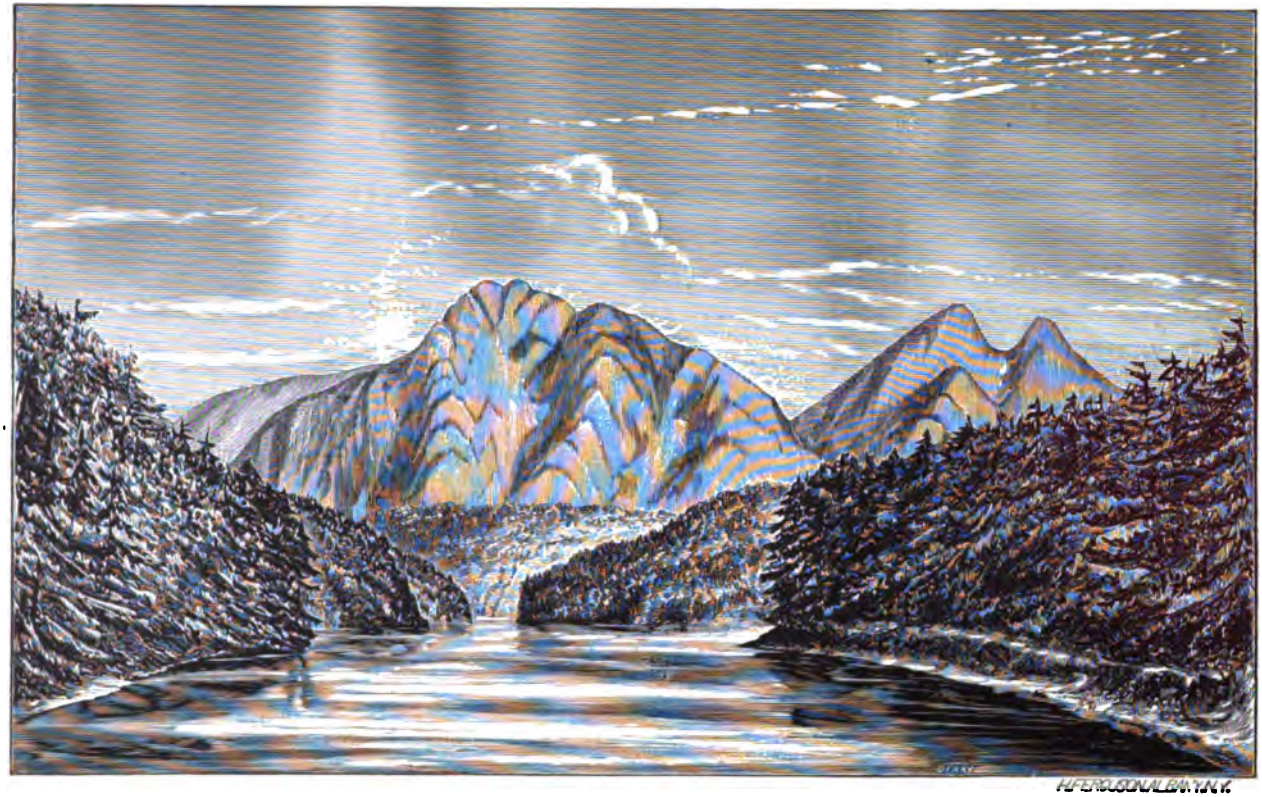
The color of the water here is a dirty white, caused, I presume, by volcanic ashes held in suspension, contrasting with that of the Skagit, which, though itself discolored by the freshet, was of bluish hue.

Some miners, also, had ascended it, for a couple of days, to within a short distance of the snow, described it as passing through a cañon, narrowed at one point to twenty feet. Its heads were in the gorges which score the sides of Mount Baker.

At the foot of the mountain was a level plain two or three miles wide, of black volcanic rock and sand, upon which were vast piles of half-burned timber, apparently swept down by a current of, as they supposed, lava, but more probably water.

A stream of lava was visible on the side of the mountain, and also on this plain, and sulphur was found scattered over its surface. They saw smoke ascending on the eastern side, about two-thirds the distance above the snow line. The Indians living on the river told me of an eruption of Mount Baker, many years since, doubtless the same which Mr. Yale has referred to, as elsewhere mentioned.

I noticed no trachytic boulders above this stream. The slates continued for some distance, when they were succeeded by sienitic quartz ore and felspathic rocks. The boulders consisted of the usual variety of crystalline and porphyritic rocks, serpentine, actinolite, and slates.



VIEW ON FRAZER RIVER—ABOVE FT. HOPE (looking down).

In crossing the mountains, during the subsequent season, I had an opportunity of examining this river, above the cañon. It presents, on a small scale, a very remarkable parallelism to Frazer River. Heading, as before mentioned, east of the true Cascades, in about the latitude of Fort Hope, it pursues, at first, a southerly course in a trough between the two ranges, and, cutting diagonally through the main range, runs westerly to the sound.

Its valley above the east fork, where the passage through the mountains commences, is narrower, not exceeding a mile in width, and consists of level tables or terraces, rising to the mountains on either side. This bottom, which is twenty or twenty-five miles in length, and separated into two basins, is stony, with but little soil, except here and there on the bank, and most of the timber is thin and scrubby.

Frazer River.

Frazer River, which, down to Fort Hope, in longitude 121° 30′ and latitude 49° 27′, somewhat over 100 miles from the coast, pursues a general southerly course, there turns suddenly westward, emptying into the Gulf of Georgia, in about latitude 49° 6′. Its volume of water is nearly as great as that of the main or north fork of the Columbia above Walla Walla. Besides several minor tributaries, it receives, below Fort Hope, two large ones, both entering from the north,—Pitt River, about twenty-five miles from its mouth, and Harrison River, some thirty-five miles further, each being the outlet of a large lake. Pitt Lake is said to be about twelve miles in length; Harrison is about twenty-five or thirty. They both fill deep gorges in the mountains, which rise abruptly from their banks, and in many respects bear a strong resemblance to the fiords of the coast.

The latter is fed by the Silowat, on the upper waters of which is another similar expansion, connecting by a portage, and another chain of lakes, with Frazer River, about

100 miles north of Fort Hope. These two add, of course, a considerable part to the ultimate volume of the main stream.

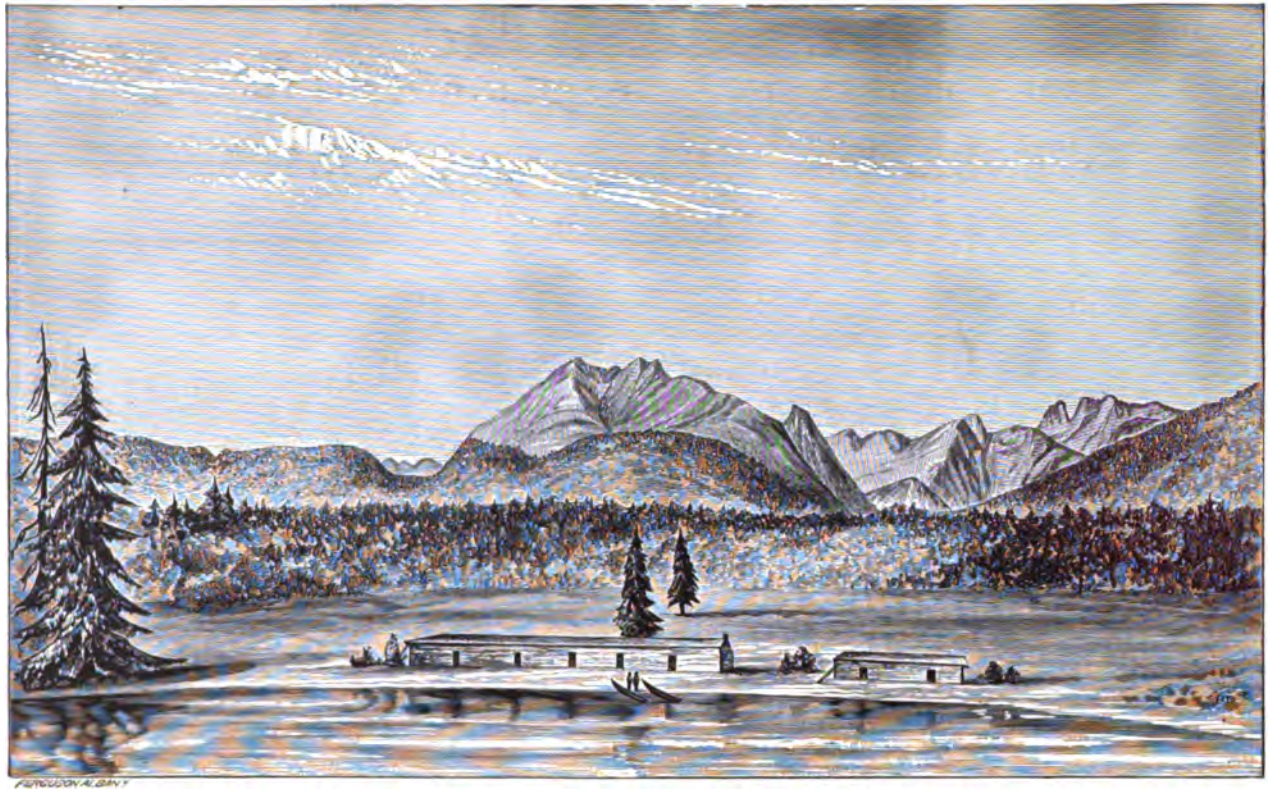
The entrance of Frazer River into the Gulf of Georgia is marked, as might be expected, by shoals, the deposit of its freshets. An extensive tract of alluvial land, for the most part wet and unfit for cultivation, lies between its mouths, and, on the south, reaches to Siniahmoo Bay. Another mouth would seem, indeed, formerly to have entered that bay, leaving Point Roberts as a separate island.

The immediate banks of the river are chiefly alluvial for a distance of fifty or sixty miles, and are overflowed in the summer season. They are covered with cottonwood and a thick growth of willows. Back from the water are a few small prairies, of which the largest are around Fort Langley, and on the Sumass and Chiloweynck. The low lands much resemble those on the Lower Columbia.

The prairies are rich, having about a foot of black mould, with a subsoil of clay and sand. As they also are, to a great degree, subject to flood, the amount of land fit for cultivation is to be measured rather by acres than miles.

It is here, between Burrard Inlet and the Nook Sahk, and extending from a little above the Chiloweynck to the mouth of Frazer River, that the only level country in British Columbia is to be found.

The river, for a great part of the distance to Fort Hope, spreads out into numerous channels, some of them dry at low water, having extensive "bars" of sand and gravel, and low islands between them. It is often, in fact, two or three miles between the extreme banks. The influence of the tides is felt as far as the Sumass, fifty-five miles up, where the first rapids occur. Thence to Fort Hope the average fall is from sixteen to eighteen feet per mile.



THE LANGLEY BUTTE, FRAZER RIVER.

The valley becomes permanently narrowed at eighty miles, mountains setting in on both sides.

Above Fort Hope the river itself is contracted in its passage through the gorge of the mountains.

Here the rapids become much more frequent and difficult, and near Fort Yale the first falls occur, beyond which, even canoe navigation is highly dangerous, and at times impracticable.

The freshets commence, according to the season, from the middle of April to the beginning of May. The water reaches its height toward the end of June, and remains up until some time in August. As near as I could judge from the water-marks, the rise at Fort Hope must reach twenty-five feet.

Our first visit to this river was in March, 1858, where a canoe party, consisting of Mr. Gardner, Dr. Kennedy, Mr. Peabody, and myself, ascended as far as Fort Yale, fifteen miles above Fort Hope. At this time reports of the discovery of gold upon its banks had just reached the lower country, and we met, on our return, the earliest parties who were proceeding to explore it. The only whites then resident were those belonging to the Hudson's Bay establishment of Fort Langley, and the small post at Fort Hope. We had amused ourselves, as we paddled round the bends of the river and coasted the shores of Harrison Lake, in speculating upon the time when the stroke of the axe, or the dash of wheels, should awaken unknown echoes among the mountains, little suspecting that in a few months steamers would run in opposition-lines upon those waters, that the tongue of half Christendom would be heard there in chorus, and the uncouth utterances of the Indian be rivalled by those of the Chinese.

The country on the Upper Frazer, or that above Fort Yale, was not examined by any of our parties, but from the description of others it is not such as to invite settlement.

On the west side of the river there are high rocky mountains, covered with snow in June.

On the east side, above the great cañon through which it passes the mountains, it consists of table-land 1,000 to 1,500 feet in height, timbered only in the ravines, unfitted for agriculture, but affording good grazing.

The cold in winter is intense, but the amount of snow not very great. Ice does not disappear altogether until April.

Farther north, the winters are represented as almost Arctic in severity and duration.

The whole country between Frazer River and the coast consists of mountain-ranges extending in a direction N. N. W. and S. S. E.

These, where they do not reach into the region of perpetual snow, are, as in the Cascades, covered with forest. They present the aspect of heavy masses, with steep slopes down into narrow valleys, or rather gorges, their crests being often surmounted by sharp and angular but sometimes mamillary points.

The passage of Frazer River through the mountains, though perhaps inferior to that of the Columbia, is still a scene of rugged and desolate grandeur. The forms of many of the summits are singular in the extreme. The forests which hang on their sides are broken by escarpments of rock, and the river, itself compressed within narrow walls, rushes through as if impatient for the liberty of the ocean.

The common rocks throughout these mountains are granitic, sienite being most abundant, true granite, as usual, less so. Diorite and eurite were occasionally noticed. Quartz alone, however, is the constituent of even mountain-masses. Almost all of these contain pyrites, giving them, when exposed, a general sombre hue. Talcose slate occurs on the east side of Harrison Lake, at the peninsula, pudding-stone at a single locality near Fort Hope.

I have elsewhere spoken of Burrard Inlet as constituting the northern boundary of the drift. This formation is not conspicuous on Frazer River, but still shows itself at various points, as in a range of upland crossing it below the mouth of Pitt River, and again at Fort Langley. It occupies much of the country between Frazer River and the Nooksahk. Point Roberts is a detached mass of it. As a general thing, the constituents of the drift here are finer, containing more sand and less gravel than farther up the sound.

I saw nowhere any tertiary rocks, though doubtless they underlie the lower basin of Frazer River. Since the commission left this part of the country, coal has been reported on Burrard Inlet, but whether it belongs to the miocene or cretaceous I have not heard. Its geographical situation would point to the latter. Metamorphic slates were noticed at several points on the river, seemingly resting against the sienite; as, for instance, at the foot of the isolated mountain near the mouth of the Sumass.

The mineralogy of Frazer River, apart from the gold, is uninteresting. Native copper has been found in small quantities, and a silver-mine was reported to have been discovered above Fort Hope; but the specimens furnished me for examination contained nothing but galena. The gold placers have been so largely developed since our visit that I do not venture to describe them.

The history of exploration here, as well as in California and Australia, is one to which new chapters are daily added. The metal found below the cañon was in fine particles, showing the distance of its origin, and was soon exhausted by the swarms of miners who poured in during the earlier excitement.

Amidst many discouragements, the search has been extended up the river to its remotest sources, until, in the extreme north, where the severity and duration of the winters is appalling, and all transportation is on the backs

of the Indians, it has been found in an amount and in such large masses as to recall the palmy days of California and Australia. As usual upon the Pacific coast, platina is found associated with it.

At the lower end of Harrison Lake, near the outlet, a hot spring bubbles up among the rocks, close to the water's edge, emitting a very perceptible odor of sulphur, and having its peculiar taste. Having no thermometer reading over 130° Fahr., we were unable to ascertain the temperature, which much exceeded this, being probably not less than 180°. Some of the water was brought off for analysis, but the bottles containing it were unluckily broken. A qualitative analysis of the deposit, made by Dr. Wolatt Gibbs, gave oxide of calcium, anhydrous sulphuric acid, and a tolerable quantity of binoxide of silica and chloride of sodium, with smaller parts of sesqui-oxide of alumnium, sesqui-oxide of iron and oxide of manganese.

The changes occurring on the bars and low islands of this and other similar rivers present many points of geological interest.

In places a recent deposit of sand or silt, a foot thick, covers the sod or vegetable accumulation of previous years, willow and brushwood protruding through it. Elsewhere trunks of trees are seen in the banks, imbedded to the depth of several feet. Sometimes large piles of driftwood, including immense trees, lodge upon the bars, and the eddies caused by the freshets excavate beneath them deep hollows, into which they settle down.

At the time of our ascent, masses of ice were lying upon these flats, melting in the sun or rain, and leaving deposits of earth and stones, which they had brought with them, as well as deep furrows ploughed up in their progress.

The surface of many of the gravelly bars, in fact, looked like a potato-field after harvest. Ascending the river, the change in the size of the detritus was noticeable.

Above the Sumass, the bars, which had been exclusively of sand, became gravelly; farther up, the gravel was succeeded by pebbles and cobble-stones, and on entering the mountains, near Fort Hope, irregular masses of rock, often of large size, line the banks; some fallen from above, others transported by ice. Immense numbers of the skeletons of salmon, which had drifted down exhausted by spawning, were scattered over the bars, the vertebræ sometimes connected, sometimes broken up, and the bones perhaps lying in piles, where birds had been feeding. Leaves of various trees were also plastered over the stones. On the sand and mud, besides these remains, were footprints of men, dogs, and birds, and cracks produced by drying in the sun. All these were in store for the geology of times to come.

Western Slope of Cascade Range.

The Chiloweynck and Nooksahk, secondary streams, run in transverse troughs between spurs, and do not serve any range. It is noticeable that the upper and middle course of these streams are exactly parallel to each other, and the Skagit, and some of its branches opposite, and likewise nearly parallel, make, as it were, acres of concentric circles around Mount Baker. Another point observable is, that Frazer River, the Nooksahk, and Skagit, as they approach the coast and enter upon the lower tableland or alluvial bottoms, all deflect from their westerly course and turn south-west at nearly the same angle. The cause of this uniformity, for cause there must be, I have failed to detect, unless it be in the tendency of rivers to conform their course toward the point of ultimate *debouchement.*

Thus, the Strait of Fuca being the common outlet of all these waters, and the ebb, aided by the river-current, being stronger than the flood, the mouths of the streams have, where from the nature of the ground they could be affected, varied in that direction. The course of the

Skagit, at a superficial view contradicting this, really corroborates it, as its waters pass round to the south of Whidbey Island. In like manner the Swohomish, and other streams emptying farther up the sound, run toward the north-east.

The mountains nearest the coast appear to have been formed by the intrusion of igneous rocks through the sedimentary strata of the Puget-Sound Basin, slates being prevalent to a height of at least 4,000 or 5,000 feet, or to that of the main divide between the Chiloweynck and the Nooksahk. Mr. Custer found slate and limestone on the summit of Signal Peak and dolomite on that of Layomesan.

Following up the Chiloweynck, limestone and slates are the prevalent rocks.

These are usually much altered and upturned at various angles. I saw no fossils in place, but two fragments of limestone were found in the river, including organic remains; one crinoid, the other a coral, which, in Mr. Meek's opinion, were either Devonian or carboniferous, but they were not sufficiently characteristic to identify them with certainty. I suspect that the latter hypothesis is the true one, and that they here represent the carboniferous rocks of the Sierra Nevada; the crystalline limestones of the Chiloweynck, like those of San Juan, being merely altered forms of this epoch.

On the Nooksahk, near the mouth of the Cowap Creek, Mr. Custer found numerous fragments of slate containing vegetable impressions in a high bank, which Dr. Newberry recognized as tertiary, and similar to those of Bellingham Bay.

The mountains between the Chiloweynck and the Nooksahk were explored by Mr. Custer. The average elevation of the general divide is about 5,000 feet, the peaks reaching 6,000 to 7,000, with a few as high as 8,000 or 9,000 feet.

It is noticeable that the highest are not situated upon

the main divide, but upon spurs. The watershed is nearest to the Nooksahk, and the streams running into it are, of course, short and excessively rapid.

The affluents of the Chiloweynck are themselves torrents, their descent being from four to five feet in a hundred.

The scenery of this region, as might be supposed, is wild and picturesque to a degree. The higher peaks rise in almost acicular points of naked rock, accessible only to the foot of the mountain goat; broad snow-fields, which hardly yield to the last heat of summer, are interspersed on the more level summits, or lie in sheltered basins; precipices of tremendous height overhang the heads of the streams, among which are inclosed small but deep lakes; cascades leap down the sides of the mountains, and spread over the lower ranges is the deep forest of evergreens.

On the south peak of the Tummeakai, just at the line, a fall of forty or fifty feet in height marks the boundary, and others above it make in all some two hundred feet. On the west side, a few miles below, are two cascades falling into it, from the mountain, one of 100 the other of 150 feet.

A still grander scene is at the Putlushgohap Lake, on the eastern fork of the same stream. There the mountain overhangs the water in an almost perpendicular bluff of 1,000 feet; cascades, some of them nearly half that height, fall in spray from its sides; the lake itself, towards the end of June, was still sheeted in ice and snow, and its outlet was a continuous fall of nearly 1,000 feet in half a mile. Above the noise of the stream the roar of avalanches was heard at intervals.

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CHILOWEYNCK RIVER AND LAKE.

The boulders in the lower part of the Chiloweynck were chiefly gneiss, sienite, greenstone, felspathic porphyry and earthy jasper, with a finer gravel of slate. The first granitic rocks noticed, on ascending the river, were on the Senehsai, about half-way between the bend of the river and the lake.

The rock there was on the south side sienite; on the north, quartzite, gneiss, and sienite, with some slates; and upon a high peak, ascended by Mr. Custer, sienite, quartzite, and diorite. Around the lake the mountains are almost entirely sienite, externally blackened by the decomposition of pyrites.

In its feeders, however, were pebbles of argillaceous and felspathic porphyry.

The Chiloweynck constitutes the most favorable access to the parallel through the mountainous region south of Frazer River, one of the tributaries of the lake from which it issues heading in the Chuchchehum Pass, in the immediate neighborhood of the line..

This stream enters Frazer River near the point where the level country ceases, turning suddenly from its westerly course northward round the foot of a range of hills.

At its mouth is a tract of prairie-land, of some extent compared with the rest of this region; but, as usual, it is liable to flood. Above its bend it has no valley, the hills coming down close on either side, and leaving only occasional bars. Throughout, it is a bold and rapid torrent, though without any actual falls, the water running over a bed of boulders with an average descent of about fifty feet to the mile.

Camping on its banks, one hears at night the noise of these stones moving over one another, often resembling the human voice, and can hardly wonder that imaginative races have peopled such streams with spirits and demons.

The lake is about five miles long, and its height above

VIEW ON CASCADE RANGE—FROM CHILOWEYNCK RIVER, NEAR 49th PARALLEL.

the sea over 2,000 feet. It is environed by mountains, the peaks of which reach an elevation of 5,000 or 6,000 feet above its level, and are covered with snow-fields and glaciers. Its waters are very deep, clear, and transparent, and the views it presents are almost unequalled, even in this region of wild and solitary grandeur.

While stationed at the depot, near the upper end of the lake, I carried a line of soundings across to the opposite shore. Its width here was 1,200 yards, and the depth was found to increase gradually for about a third of that distance, where it attained thirty-five fathoms.

This was maintained to within a short distance of the western bank, where forty fathoms were found. Its depth is doubtless much greater farther down the lake, where it is wider and less affected by the detritus of the streams. At either end a beach of coarse white sand, of quartz and felspar, was thrown up, the result of disintegration, as the sienite and small patches of sand, brought down by its two affluents, extend out to some distance. Below the lake, stretching like a dam across the valley, is a high plateau or terrace, cut through on the south side by the outlet.

At Chiloweynck Lake the pass of the Cascade range commences, following up one of its feeders to the summit, a distance on the parallel of about nine miles.

Upon the creek is a small lake, or enlargement of the stream, caused by a slide from the mountain, which has blocked up its course, the sides being steep slopes of rocky débris.

This pond presents an interesting phenomenon in the beautiful color of its water, arising from a deposit on the bottom. In the deeper parts it is a pure azure; where shallow, of a light milky or verdigris blue. The deposit is gelatinous, and covers the entire bottom, clinging to stones and sunken logs, strewed over it, to the depth of a tenth of an inch. When first taken up it was of a milky, opal hue, but becomes gray when dried. The water itself

is perfectly transparent and tasteless, and the deposit has merely a slight earthy taste. It is evidently brought down by the brook. The lake becomes dry in the late summer and fall.

The divide at the head of this pass forms, as it were, a bridge or level plateau, perhaps a quarter of a mile wide, connecting the mountains on either side. I had not time, in crossing, to ascertain its identity with the drift, though, like the terrace at the foot of the Chiloweynck Lake, its conformation suggests such an origin.

The height of this divide is 4,533 feet above the sea. A corresponding ravine, one of the sources of the Manselpannik, a stream emptying into the Skagit, heads under it on the east. The pass, therefore, though on the summit of the true Cascade range, is not a watershed between Frazer River and the Columbia, but only between two streams debouching through the Strait of Fuca.

A noticeable feature of nearly all these mountain streams is that, on their upper waters or directly under their principal sources, they run through narrow but *flat* valleys, having a comparatively gentle slope, once undoubtedly the bed of what may be called fluviatile lakes or expansions of the rivers, and that their lower or middle course, according to the length of the stream, is more rapid and broken.

Thus Mr. Custer found, on the Upper Nooksahk, a level bottom of some fifteen miles in length and a mile wide, heading in marshy lakes, below which the river resumed the character of a mountain-torrent, until it reached the drift and alluvial lands of the sound.

The elevation of this valley is about 2,000 feet above the sea. On the Chiloweynck, the principal feeder of the lake, called by the Indians Klahaihu, in like manner carries a level valley to almost its very source. The same is true of the Upper Skagit, and, in fact, of nearly every stream of considerable length, and measurably so of the great branches of the Columbia itself.

MOUNTAIN ON KLAHAIHU CREEK.

The larger rivers frequently present a series of these basins. It is not only through districts easily eroded that the lower rapids occur, but frequently among rocky hills through which they have excavated cañons.

I have used the phrase *flat* valleys to designate those which present no visible concavity in their sections, but where deposits have created a level surface between the inclosing mountains. The occurrence of this form, as distinguished from the shape assumed in erosion, is exceedingly common.

Cascade Mountains. (General Features.)

The geological features of the Cascade range, north of the Columbia River, so far as exhibited on their eastern declivity, were described at length in a previous report.* From Mount Rainier, the rocks observed were chiefly trachytic or basaltic, with eruptions of lava of various ages, some of those of Mount St. Helen's being of very modern date. Interstratified with the basalt is a volcanic conglomerate, generally of a reddish color and very harsh texture, containing often masses of basalt and lava, but at other times assuming a tufaceous character.

North of Mount Rainier, crystalline and metamorphic were mingled with volcanic rocks in the boulders of the streams, until reaching the Winatsha, when the two former alone prevailed. I have since had an opportunity of crossing the mountains by the Nahchess Pass to the north of Mount Rainier. The rock, in places, from Mount La Tête to the summit, and thence some distance down the eastern side to Edgen's Rock, was volcanic conglomerate, and this, judging from appearances, constitutes the elevated points from Mount Rainier northward.

That portion of the chain exhibits a very marked difference in profile from the more southern, ragged and

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*Vol. 1, P. R. R. Reports.

broken peaks replacing the flowing lines and broad surfaces of the latter.

In ascending the Chuchchehum Pass, from the west, the rocks noticed were a fine-grained lamellar feldspar, quartzite, and diorite. On the mountain, to the north, sienite, quartzite, and slates, the former most prevalent; and in descending, to the eastern side, gneiss and slates, and a dark-colored quartz rock. On the mountain, south of the pass, I observed chiefly slates, with seams of quartz, greatly inclined and sometimes vertical. Still farther south, Mr. Custer, who took a route up the Klahaihu, crossing the range and descending to the Skagit valley by a branch which he named Glacier Creek, found sienite and a rock consisting of quartz and felspar without hornblende. The sienite appears to form the highest peaks of the range. In the Skagit valley, sienite, diorite, and quartz predominated. The summits of this portion of the range rise into sharp and serrated ridges, or peaks, of which a characteristic feature is, that on all the highest, nearly perpendicular walls, either of sienite or slates, inclose sloping basins, conveying the idea of craters, one side of which has broken down. These are generally the seat of snow-fields, or glaciers. Mr. Custer's observations, which were very extensive, led him to the conclusion that most, if not all, of them faced to the west or north, the greater number to the west.

LINE OF PERPETUAL SNOW.

As is everywhere the case in temperate zones, the altitude of the line of perpetual snow is too variable to be stated with certainty. On the northern sides of the mountains, in deep and sheltered gorges, and the crater-like basins, snow often lies all the year round, at points comparatively low down, while the summits themselves are bare. The sharp and precipitous crests of the higher peaks are unfavorable to the retention of snow, which slides in avalanches into the gorges beneath.

MT. RAINIER—FROM FT. STEILACOOM.

Of the true snow-peaks, the isolated volcanoes which rise far above the general range, Mount Baker, 10,800 feet high, and Mount St. Helen's, probably 12,000, are sometimes almost entirely denuded of snow, while even on Hood and Rainier it disappears to a great extent. On these, much of the melting is indeed probably due not to the heat of the sun, but to the warmth of the rocks beneath, under which the fires are not yet extinct.

The altitude of the more considerable snow-fields on the 49th parallel, which, on the north and west sides of ordinary summit-peaks lie all the year round to a considerable depth, may be stated generally at 7,000 feet. Some of the glaciers come down lower, though none, at present, extend into the valleys proper. They are all of De Saussure's class of summit-glaciers.

Line of Vegetation.

This is not much more clearly marked, for it seems limited rather by the existence of soil than by elevation. Mr. Custer found Alpine plants and mountain grasses as high as 8,000 feet. The forest-line, however, is more distinguishable, and his observations and measurements lead to the conclusion that the line where timber, properly speaking, ceases, is remarkably uniform throughout the whole western Cascades.

The disappearance is very rapid, the trees retaining quite a large size to within a short distance of the point where they dwindle down into shrubs. It is noticeable that they extend farther up the western and northern than on the other sides of the mountains. The elevation of this forest-line may here be placed at 6,500 feet.

Lieut. Kautz, as mentioned below, found pines at a much greater height on Mount Rainier, viz., 7,268 feet; but this was probably due to local circumstances. East of the Skagit River, and thence through the interior basin, it attains, I think, a higher point than the average above given, notwithstanding the increased cold.

PRAIRIE-GLADES.

The distinguishing feature of the eastern slope of these mountains is the number of prairie-glades covered with grass, and, in the summer and early fall, blooming with a great variety of flowers. On one of the summits which I ascended, overlooking the valley of the Skagit, and elevated about 6,000 feet above the sea, these open tracks extended for a considerable distance, bounded only by the ragged crests and ridges of the interior range, in which were inclosed snow-basins and glaciers, the heads of numerous torrents tributary to that river. From an elevated point, a sea of mountains stretched in every direction as far as the eye could reach. To the south and south-west was the great mass of the Cascade range, Mount Baker being distinct among the rest.

Eastward, beyond the Skagit, the mountains presented a different aspect. They were of far more uniform height, with very few prominent peaks, and a general elevation of perhaps 5,500 to 6,000 feet.

They are also more bare of timber than in the western or main range. This equality of elevation, however, did not extend south of the parallel where Hozumeen and other naked serrated points reared themselves to a level with the summits of the Cascades proper.

GLACIERS.

Separated from this standpoint only by a deep gorge was a glacier, which formed, at the same time, the head of the Manselpannik and of another stream running to the Skagit. It seemed to be a half mile in extent, occupying the northern slope of a walled basin, and having an apparent inclination of 30°.

The termination was abrupt, and, as I judged, at about 5,500 feet above the sea-level, or 1,400 feet over the Manselpannik, to which a steep talus of débris led down. The field was mostly covered with snow, the blue ice showing chiefly at its edge. Numerous fissures ran

across it and divided it vertically. There was no arched opening for the water which ran down the rocks and gathered into a rapid stream below. Of the thickness of the ice I could form no opinion.

Mr. Custer saw on the Wailagonahoist Mountain, at the head of his Glacier Creek, a much larger one. The mountain itself he estimated at about 9,000 feet, on the side of which the glacier, somewhat interrupted, extended for about three miles. Its slope appeared to be as much as 70° and the vertical height covered by it 3,000 feet. It, in fact, reached entirely down to the valley. The stream here issued from a single vault and of considerable size, the water being of a whitish or milky blue. Numerous cascades from the adjoining mountains added to its volume.

In this neighborhood, also, the open glades occurred on the summits. They were rolling with gentle slopes, and inclose basins and shallow depressions, or extend down into the heads of gulches, from which arise small streams.

The glacial region has here undoubtedly been of almost Alpine extent, for these glades, in their surface, give evidence of the action of ice, at a period, geologically speaking, not very remote.

The snow, which falls to the depth of twenty or thirty feet, still lay in the middle of August in patches, especially in the basins.

Elsewhere it had so recently disappeared, that the grass was either dead or just recovering its verdure. I noticed in one of the depressions where a very distinct though small moraine had evidently been ploughed up.

On this mountain the first red snow was noticed, afterwards also seen on the mountains east of the Skagit. The coloring matter, probably *hematococcus invalis*, was so abundant that, in crushing a handful, the water exuding was reddened, as if with blood. On examination with a pocket-lens, the organisms which furnished it

appeared of a tadpole shape, or with a large rounded head and attenuated tail.

It is probable that at least the tributary valleys, such as those of the Chuchchehum and Manselpannik, have been the seat of more extended glaciers, though the dense forest might conceal the moraines which they would have left.

As, however, the level and terraced bottom of the Skagit, in the valley below here, where, from the more scant vegetation, the existence of moraines would be traceable, does not indicate their having reached it, and as no boulders are scattered over the surface, another proof is afforded that, since the glacial period, a subsidence of the land has admitted the entrance of the sea into the interior valleys, and, in modifying and arranging the drift, has covered also the débris of the glaciers.

VOLCANOES.

The only ascertained volcanic mountain in the Coast range of Oregon or Washington Territory is Swalalahos, or Saddle Mountain, about fifteen miles south of the Columbia River.

Its height, as compared with those of the Cascade range, is insignificant, and it has apparently been long extinct. It is composed almost entirely of conglomerate, and no lava streams appear to have issued from it, though it contains dikes of basalt. The crater is said, by Prof. Dana, who examined it, to be about two miles wide, and apparently 500 feet in depth, and is now covered with forest.

In the Cascades, the line of snow-covered summits which crown the range, and all of which are or have been the seat of volcanic action, has attracted the attention of every Western traveller. Of those south of the Columbia, Mount Hood only will be here referred to. Several of the others have been described by Dr. Newberry in his report on the geology of Lieut. Williamson's expedition.

In crossing the mountains by the emigrant-trail, some years ago, I made a sketch of the crater of Mount Hood, which accompanies this report. It faces the south, the wall on that side having been broken down, and is occupied by a snow-field. This mountain was first ascended by Capt. Gordon Granger, of the Regiment of Mounted Riflemen (now Major-General), in 1850, who reached the crater, but not the highest pinnacle. A second ascent was made in 1854. Of a number of persons composing the party, Mr. Thomas J. Dyer, of Portland, Mr. Wells Lake, and an Indian named "Cockup," alone reached the summit. The last was excessively proud of his exploit, as having overcome a superstition of his tribe.

Steam was visible in many places, escaping from small blow-holes in the crater, and ashes of a reddish color were collected, which, from their dry and pulverulent substance, were apparently recent. No glaciers were seen in the deep ravines which form the heads of the streams. Stumps of trees, weathered but undecayed, were abundant above the line of present vegetation, a fact very probably connected with the cooling of the mountain.

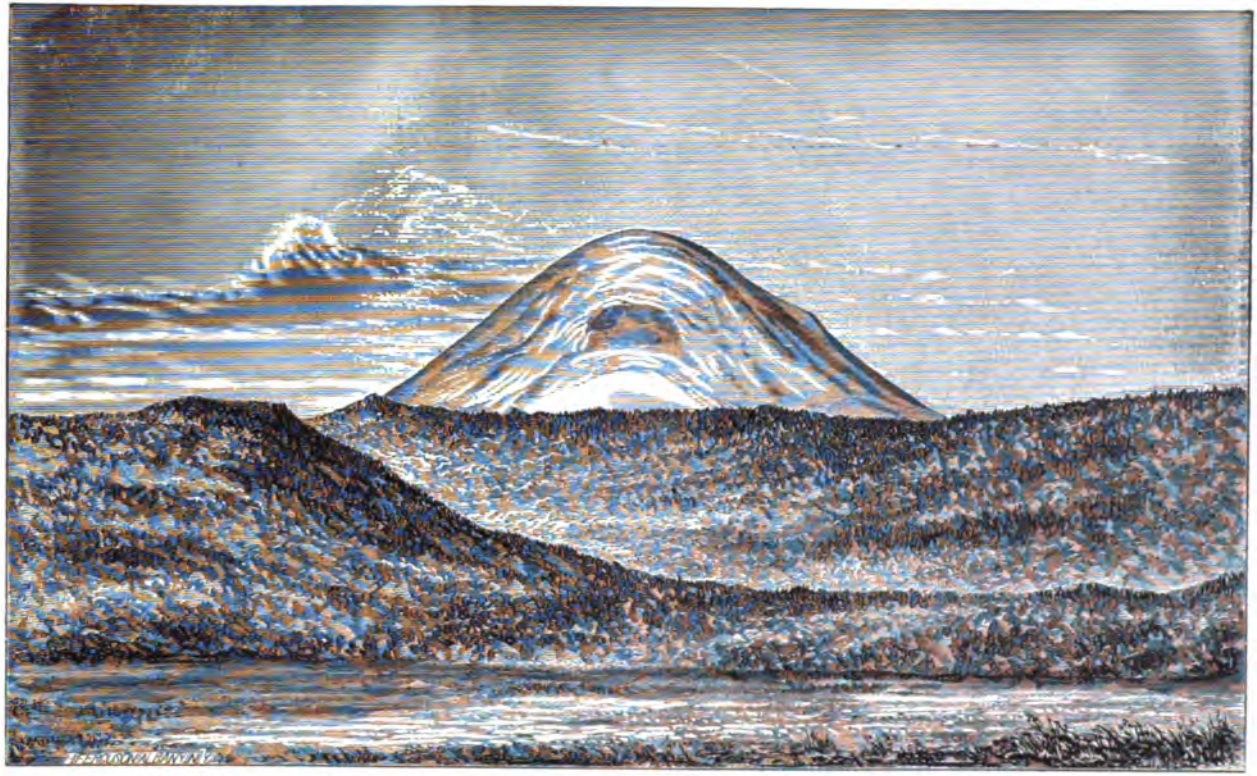
Mount Hood, though undoubtedly the highest of the range, is not visible from the ocean, owing to the intervention of the Coast range. From the plains to the east, and from Fort Vancouver below, it is a conspicuous landmark. Its general form is pyramidal, its sides exhibiting prominent ridges or foldings, but not so regular as those of Mount Rainier. The great discrepancy in the elevations assigned to these mountains by different writers is noticed by Humboldt.* Those familiar with all of them assign the supremacy to Mount Hood. Its probable elevation is 14,000 feet.

North of the Columbia River, and nearly equidistant from it, are two peaks, for a long time confounded with each other, Mount Adams and Mount St. Helen's. Of

* Cosmos, vol. v.

these, the former is nearly on the line of the general range, the latter some forty miles to the west. Both are situated on a broad plateau of mountains, the Cascade range having here its greatest width. The two peaks have nearly an equal height, and are probably not under 12,000 feet. Mount St. Helen's is visible for a considerable distance off the mouth of the Columbia, and at various points on the river as far as the Cascades; Mount Adams from the plains, and in most situations they bear a considerable resemblance to each other. St. Helen's is, however, much the more regular in outline, having a dome-shape, as exhibited in one of the accompanying sketches. Views of these two, and of Mount Hood, taken from the summit of the pass at Chequoss, give an excellent idea of their surroundings. No modern eruption of Mount Adams is recorded, but its former discharge of lava must have been copious, from the streams seen by Capt. McClellan's party, in crossing the range, near its foot. Mount St. Helen's is still active, though it has ceased to emit lava; its flow of this material was, however, apparently much later than that of its fellow, for one very extensive field, evidently proceeding from it, was seen, as clear and sharp in its fractures as if but just cooled. Smoke and steam are seen frequently to arise from near its summit, and considerable eruptions of ashes have occurred as late as 1842 and 1843. Fremont mentions that in November of the latter year "two of the great snowy cones, Mount Rainier and St. Helen's, were in action. On the 23d of the preceding November, St. Helen's had scattered its ashes like a light fall of snow over the dalles of the Columbia, fifty miles distant." Other travellers put the dates at 1841 and 1843. Fremont is, however, in error concerning Mount Rainier. It was Mount Baker that was then in action. Mount St. Helen's was ascended by Mr. Dyer in 1853.

The most prominent mountain, in going northward, is Mount Rainier. It is situated on the western side of the



DOME OF MT. ST. HELENS—FROM CHALACHA PRAIRIE.

range, and is visible from the east only on the lower part of the Yakama valley. In other directions, it can be seen from the mouth of the Willamette, from the coast of Shoalwater Bay, and from Port Townshend. It is, however, from the plains near Steilacoom, on Puget Sound, that it exhibits its full grandeur.

It seems to spring from the very level of the table-land, and though sixty miles off, "as the crow flies," appears at times, in that pure atmosphere, as not distant an hour's ride.

The probable height of Mount Rainier is between 13,000 and 14,000 feet; that of the general range being from 5,000 to 6,000 feet, and the adjacent mountains rise towards it in an easy curve.

The outline is bell-shaped, modified on the summit into three rounded prominences, which perhaps inclosed the ancient crater.

The sides are deeply striated by ravines of immense depth, separated by rugged and precipitous spurs. Like all the others of that range which I have seen, it has upon one side a shoulder, probably marking a former lateral opening or crater; of this, the most noticeable instance is on the Shaste Butte of California, where it takes the form of a truncated cone, engrafted upon the side of the mountain. Mount Rainier seems to have been extinct for a long period; at least no recent lavas have been observed in its neighborhood, and there is no tradition of its having been seen to smoke.

It has never been ascended to the summit; but an attempt was made in 1857, by Lieut. (now Major-General) A. V. Kautz and Dr. R. O. Craig, United States Army, who reached an altitude of 12,000 feet, as calculated by the boiling-point of water. They estimated the line of perpetual snow at 8,000 feet. There were no dead trees above the present line of vegetation as described by Major Haller on Mount Hood, and they saw no evidence of modern eruption. On its side Lieut. Kautz dis-

covered a glacier, the source of the Nisqually River, of which he gives the following account:

"The glacier from which the Nisqually rises is formed by the filling-in of an immense mass of snow and ice in a ravine on the south side of Mount Rainier. From where the river emerges to the head of the ravine the distance is four or five miles, and the latter varies in width from half a mile to a mile. The upper end is covered with snow, having immense chasms running across it. The lower end is principally ice, with much débris of rocks, sand, and gravel. It is about fifteen miles to the summit of Mount Rainier, from the foot of the glacier. The ravine narrows near its foot, and there is no terminal moraine, but there are lateral moraines, and a straggling medial one.

"The latter is not at all marked, but the lateral ones are very perfect, forming a ridge on each side 200 feet above the ice, with a slope of 60° or 70° next to the glacier, and about 45° on the other side. It is composed of the débris of the mountain, almost entirely of basalt rock.

"There is a large vein of granite at the foot of the glacier, through which it had evidently worn a passage, as the bed of the stream, for a mile and a half or two miles below, was white with granite boulders.

"The Nisqually came out from beneath the ice in a stream twenty-five or thirty feet wide, a torrent so muddy and rapid that we would not have dared to ford it. The cavern was not much wider than the stream, and about fifteen feet high. The ice was, in places, clear and blue, but in others mixed with débris."

The foot of the glacier was steep, but higher up it had a more gentle slope of perhaps one foot in five. We ascended about half-way and crossed over to the moraine on the west side, finding, with much difficulty, a camp

among the pines. Here the water boiled at 199° Fahr.,* and the thermometer stood 34°. The glacier made a terrific crushing and grinding noise during the night. We had snow all around us, but afterwards found that we could have gone 100 feet higher and obtained wood. From this camp we started at eight in the morning, and, travelling steadily till six, we had to return without the triumph of standing fairly on either peak, though we were on the top of the mountain. The summit of Mount Rainier is a ridge forming two sides of a triangle, with a peak at each end and one in the angle. We made the south peak nearly, and I could have easily reached it but for want of time. There is no indication of any recent eruption, and we saw no crater. If there is any, it is filled up with snow."

Mount Baker, the next most prominent peak, and the northernmost in Washington Territory, is fully twenty-five miles to the west of the water-shed of the Cascade range, upon a spur or offset, and about in a line with some other peaks to the southward, as Pitt Mountain and Mount Shaste. Its height is given by the United States Coast Survey approximately at 10,800 feet. It appears from the westward as a conical peak, less simple in form than any of the others.

From Frazer River, above Fort Langley, and also from the Skagit, it is seen to be truncated, or rather roof-shaped. It would seem to have only recently resumed its activity; as I am informed, both on the authority of

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* Altitude, Kautz's encampment, by Loomis's formula:

Barometric pressure, corresponding to 199°		22.971
Assumed sea level		30.042
Assumed altitude	7011.4	
Correction for temperature	234.0	
	7245.4	
Correction for decrease in gravity	23.0	
	7268.4	

officers of the Hudson's Bay Company, and also of Indians, that the eruption of 1843 was the first known. It broke out simultaneously with St. Helen's, and covered the whole country with ashes.

The natives told Mr. Yale, chief trader at Fort Langley, that the Skagit River was obstructed in its course, and all the fish died. This was, in substance, what they assured me on my visit to the river, adding that the country was on fire for miles round.

The fish, undoubtedly, were destroyed by the quantity of cinders and ashes brought down by the Hukullum. Since the above date, smoke is frequently seen issuing from the mountain.

Between Mount Baker and Mount Rainier a number of lesser peaks, presenting from the Strait of Fuca the form of a broken sierra, rise to the limits of perpetual snow. They have never been explored, but they appear, from some points of view, like the skeletons of formerly more elevated volcanic mountains.

I have heard of no volcanic peaks as existing in the Cascade or Marine range of British Columbia, but this development in the Russian dominions is extraordinary.

Sir George Simpson states * that eighty-four different volcanoes have been in operation, in the country under the jurisdiction of the Russian American Company, within the recollection of many of the inhabitants.

EARTHQUAKES.

These have evidently been of frequent occurrence, as they do not excite much astonishment among the Indians. Duflot de Mofras mentions one which was felt at Fort Vancouver, December 2d, 1841, at 4 P. M. They experienced these oscillations, of a second or more, and in a direction north and south. Mr. Yale, in a letter to me, says: "We had two that might have attracted the attention of the geologist. Both occurred after the eruption

* Overland Voyage.

of Mount Baker. The first was tremulous, and caused some dilapidation of tottering things; but its greatest peculiarity was perhaps the loud report that preceded or attended it, and the roaring noise, which continued for some time. The adjacent mountains being composed of tremendous masses of solid rock, we almost expected to behold them and ourselves sinking into an abyss. The other was undulatory, and did some injury to the foundation of our house. It seemed to have come from the westward, and to have left in its trail a cold, disagreeable, smoky vapor. Both occurred in winter. That of the 26th of December was felt here, but I believe slightly, having escaped my perception."

This last was one of December 26th, 1856, which was very perceptible at Port Townshend, where I then was, jarring the house like the fall of some heavy body. It was felt by Mr. Warbass at Whidbey's Island, and the Indians told him, in reply to his inquiry if they knew what it was, "that the earth was rising."

A very distinct shock was noticed at Olympia on the 2d of April, 1859, at 2:30 A. M. Mr. James Tilton, Surveyor-General of the Territory, describes its force as about equal to the effect of a sixty-mile-an-hour gale upon a frame house.

The crockery rattled, and many persons were awakened. There was but one shock, which lasted eight or ten seconds. The night was calm, and the tremor well defined, undulatory, and suggestive of the motion of a ship at sea.

A lady living in Olympia informed me that a pivot glass in her bedroom was made to swing so much as to attract her notice.

The direction was S. W.

Eastern Cascade Ranges.

The mountains lying between the Skagit and Okinakane, I have distinguished on the profile as the Skagit

and Similkameen ranges; but, excepting that each forms a watershed, more or less continuous, they do not possess the character of true ranges, but rather a confused assemblage of ridges with no perceptible arrangement or direction.

North of the parallel, they have a pretty equal height, not exceeding 6,000, or at most 6,500, feet above the sea, and on the summit and southerly exposures they are thinly wooded and covered with grass. South of the line, however, they are much more elevated, rising in high and ragged peaks, of which Mount Hozomeen, standing almost exactly upon it and overlooking the Skagit, is an example.

Between that stream and the forks of the Pasayten, the rocks generally were of the same character as in the Cascade range.

The divide between the two rivers was of felspar, interstratified with slate and quartz. Descending the west fork of the Pasayten, they were granitic, sienite, as usual, prevailing over true granite.

Quartz, felspar, diorite, and various porphyries also occur. In a small branch of this fork, boulders of sandstone, containing some vegetable traces, were observed; and on the mountain opposite the Chuchuwanten the rocks were sandstones, of various degrees of fineness, and conglomerates.

It is not improbable that tertiary deposits of some extent have existed here, as Lieut. Parke found lignite, in a micaceous sandstone upon the Similkameen, a little above the mouth of the Pasayten; but, if so, they have been mostly denuded or greatly altered.

The valley of the west fork has quite a gradual descent, but nowhere exceeds a mile in width. It is divided into basins, irregularly lined with terraces, some of them level and rising in benches, others resembling rather slides from the mountains, subsequently modified by water, than original deposits. The soil is of fine sand, mixed

with gravel and boulders. The south fork is more rapid, and with a narrower bottom, and below the junction the river enters a cañon, which continues to near the mouth. Crossing from the Pasayten to the Similkameen, porphyritic and altered rocks formed the mountains dividing the former from the Naisnuloh, and prevailed for some distance down the last-named stream. Below these, sienite, quartz, and blue slate were observed, sienite constituting the prevalent boulders in the stream. The quartz, in many instances, breaks into polyhedrons, huge modified crystals, often weighing over a ton. In one of these, which had been fractured, I noticed three sides of an interior hexagonal prism. In places, steep escarpments of the mountains overhang the Naisnuloh, a talus of débris resting against their sides, the fragments of which were often of great size.

The terraces on the Naisnuloh were a strongly-marked feature, occasionally attaining a height of 300 feet above the stream. They occur sometimes on one side only; at others, on both, and of equal elevation. Longitudinally, they appeared perfectly horizontal, but with a slope from the mountains towards the water. In its lower course, the Naisnuloh, as is so generally the case with these rivers, becomes more rapid, and the valley narrows. The cañon continues till within two or three miles of its mouth, from whence to the Similkameen is a level-terraced plain.

Mr. Custer, who crossed from the Skagit on to the head of the Similkameen and thence descended the latter, found the divide to consist of sienite and slates, and these rocks prevailed along his route. From the Campe des Femmes to the mouth of the Haipwil the river is nowhere very rapid; but its valley, down nearly to the mouth of the Naisnuloh, is narrow, not exceeding from half to three-quarters of a mile. From the junction of the Pasayten fluviatile terraces line the bottom.

Below the Naisnuloh the prevalent rocks were sienite,

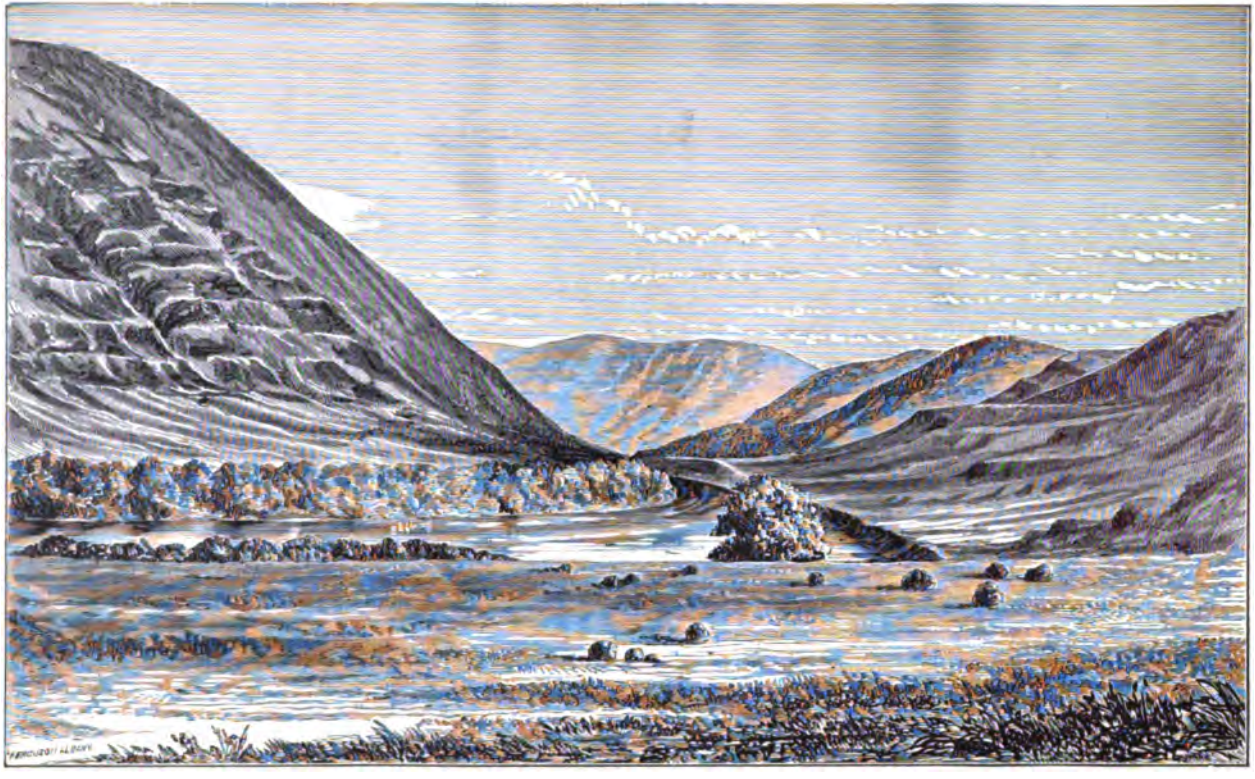
hornblende, and lamellar quartz, all greatly disturbed in their position. At the mouth of the Haipwil, alkaline deposits were first noticed in the residuum of a shallow lake which had recently dried up. There were no crystals, but the salt covered the ground in a thick effloresced crust, which at a short distance presented, as on the Sweetwater River, precisely the appearance of water, or rather of ice, surrounded by an edging of snow. The soil generally throughout the lower valley of the river seems more or less impregnated with it. This basin is nearly destitute of timber, and of but little value except for grazing. A few patches of wet and rich bottom occur, but for the rest it is all sandy; and the presence of the artemesia and the cactus would alone be sufficient proof of its worthlessness.

The mountains are sparsely timbered, and, where not denuded of soil, are covered with fine bunch grass, as are also the terraces and much of the bottom. Their slopes are generally steep, deeply furrowed by ravines, and broken by rocky escarpments, from which masses of débris extend down to the valley.

The district suitable for settlement, therefore, is of very limited extent, and that lies altogether north of the parallel. For summer grazing it is admirably fitted; but although the snow, according to Indian report, does not lie as deep here as it does on the Columbia, and their horses can contrive to subsist, it is evident that in this climate no considerable number of animals could be wintered without an artificial supply of food.

The terraces on this part of the river, and for some distance below, do not exceed thirty or forty feet in height, and extend in long level lines for miles at a stretch, the faces curving with the course of the stream.

They are not always found on opposite sides, but sometimes alternate. The normal surfaces seem to have been almost flat, but the wash from the mountains has left long sweeping slopes, sometimes extending to the edge,



SKETCH ON SIMILKAMEEN RIVER—MOUTH OF HAIPWIL.

sometimes but part way, according to the width of the plateau.

Upon some of the hill-sides are partially terraced banks, frequently extending to a considerable height, as, for instance, at the junction of the Haipwil.

A little below that stream, the terraces are greatly modified, both by erosion and by increment of detritus from the hills. Deep arroyos have been formed, the level bottom ceases altogether, and a few miles farther down, the river becomes cañoned, and presents a succession of rapids and falls, one of which is some twenty-five feet in height.

Approaching the mouth, the Similkameen valley again widens out into terraces or plateaux, which are conspicuous where it unites with the Okinakane.

The general rock of the hills, between the bend of the Similkameen and the Okinakane, are sienite and lamellar quartz, interstratified with slate. Mica schist was also noticed. In the cañon of the river, slate and quartz prevail, having a general dip to west and south-west at varying angles.

Overlying the sienite, on many of these hills, is a coarse conglomerate, containing large imbedded fragments of granite.

There are also some sandstone and indurated clay rock, which appear to be the remains of a tertiary deposit, as in a fragment of sandstone I found a dicotyledonous leaf, which Dr. Newberry has recognized to be of that age.

Unfortunately I had no opportunity of extending the search at this place.

It was in the cañon of the Similkameen that the discovery of gold, by some of the party, created one of those epidemic excitements common on the Pacific. During the halt of the commission at Camp Similkameen, some of the men, in prospecting, struck diggings on a low bar in the river, only a few rods long. The following day a sergeant belonging to the escort obtained

six dollars and twenty-five cents from nine pans of dirt, and one of the employés about ten dollars in an hour.

Subsequently two men washed thirty-five dollars in about half a day, and others various amounts, many of them approaching the above. All this was got merely by panning. The bar soon presented an amusing scene; soldiers, employés and Indians being engaged together, and all sorts of implements, from a tin cup to a frying-pan, being brought into requisition. The gold was in coarse scales, sometimes in pellets and pieces weighing several dollars. After our departure one piece was found weighing twenty-two dollars and fifty cents. The gold had every appearance of being washed down from the neighboring gulches, and the probability of this seems to have been confirmed. It may be remarked that in 1853 Capt. McClellan's party found "the color" in small particles, in surface-sand, upon all the streams emptying into the Columbia from the Cascades, and at the mouth of the Similkameen in perceptibly sharp and unwashed points, indicating a neighboring origin.

During the winter and spring of 1859–60, a considerable number of miners flocked to this neighborhood, and extended the search to the Okinakane and the Nehoialpitkwa. Owing to the physical features of the country, perhaps, more than to a deficiency of the metal, the Similkameen district was soon abandoned. The want of water upon the hills prevented sluice-washing, which alone could be permanently productive. Scattered diggings which were found upon the Okinakane likewise failed, and the only ones occupied for any length of time were those of Rock Creek, a branch of the Nehoialpitkwa, presently to be noticed. Native copper is said to have been found by the Indians in the mountains near the forks, but I could procure no specimens of it. Stains of blue carbonate of copper, in seams of quartz, were found near Lake Osoyoos, and a fragment of quartz containing galena was picked up on the Similkameen.

The geological character of the country above described prevails, according to the observations made in the expedition of 1853, through the whole of that between the Cascades and the Columbia, as far south as the Winatsha or Pisquouse River. Granite rocks, gneiss, slates, and various porphyries continued, so far as I saw, to the exclusion of basalt and basaltic conglomerates, and also to that of unaltered sedimentary deposits, except as here mentioned. I have made no attempt at their arrangement in order of supposition, though I presume the granites to be the lowest part I have seen; almost every one passes, by invisible gradations, into others.

A striking change in scenery appears in descending the Similkameen. The valley of the river, as already mentioned, is almost destitute of timber, a few scattered pines alone appearing upon the terraces, with an occasional skirt of willows along the stream. The lower hills, particularly their southern faces, are also bare of forest. The whole of the eastern Cascades, in fact, present a dry and arid appearance, as contrasted with the moist fertility of the western range.

Okinakane Valley.

Sienite, gneiss, and granite are the prevalent rocks of the Okinakane below the mouth of its principal tributary. Above that point, the same rocks were capped with the coarse conglomerate noticed on the Lower Similkameen.

At the lower end of the great lake, claystone porphyry was noticed. Very little of this valley is fitted for cultivation, as the soil is sandy, with alkaline deposits. Timber is confined to the mountains, except a few cottonwoods and willows in the bottoms.

The Okinakane, as well as the Upper Columbia and Frazer rivers, is remarkable for its fluviatile lakes, formerly still more numerous through this northern country, but the most of which have been drained by the

gradual wearing down of the river-beds. These, indeed, were but the remains of those arms of an interior sea which extended up into the narrow and trough-like valleys between the mountain-ranges.

The largest of the Okinakane lakes is over sixty miles in length. Between it and the forks of the Similkameen are four smaller ones, and its valley, below that point, is divided into basins, where others once existed.

I have assigned all the mountains west of this river to the Cascade system, as will be seen hereafter. The trough or valley of the Okinakane is nearly 400 feet lower, on the forty-ninth parallel, than the Columbia River at the same latitude; and the difference in altitude between the great lake and the upper Arrow Lake of the Columbia, a degree to the northward, is probably as much. This stream, therefore, forms the true trough of the interior basin. Its course, which is from north to south, is continued by that of the Columbia, from the junction to the mouth of the Snake, near Walla Walla. As usual, the descent of the Okinakane is more rapid on its lower than its upper portion.

The terraces of this valley are among the most noticeable features of the region, and it is in this neighborhood that the coulées, or, as termed by Lyell, landstraits, are almost strikingly exhibited.

As they will be noticed in a separate chapter, I shall not particularly describe them here. The general height of the lateral or river terraces was from 250 to 300 feet.

NEHOIALPITKWA RIVER.

From the first summit of the divide between the Okinakane and the Nehoialpitkwa, elevated about 2,200 feet above the former, a view opens to the south-west and west, as far as the range bordering the Methow River, and the Tchopahk Mountain on the Similkameen. The scenery has a desolate character from the barrenness of the hills and the yellow hue of the herbage. Except

where escarpments of rock project, the slopes of the mountains near the river are gradual and the lines of terraces well marked. The actual summit is about 1,000 feet higher, being over 3,000 feet above the Okinakane, or 4,067 above the sea. It maintains the same character of grassy slopes and plateaux with skirts of timber, and, on the highest points, forest. Terraces and knolls continue to the top, the former having an amphitheatrical arrangement.

The divide between the two rivers, like that between the Skagit and Similkameen, is very narrow; the Schainks, the western branch of the Nehoialpitkwa, heading within a few miles of Lake Osoyoos.

The character of the Nehoialpitkwa, a secondary stream, is a miniature of the larger ones. The main river runs southerly to the neighborhood of the parallel at the junction of the Schainks; thence, turning easterly through a valley formed of a series of basins, it receives its two principal feeders also from the north, and, then bending suddenly nearly south, reaches the Columbia opposite Fort Colville.

The lowest of the two main tributaries is the outlet of a long fluviatile lake. None of any consequence come in from the south. As usual, it is cañoned at its lower extremity.

CENTRAL RANGE.

The mountains between the Okinakane and the Columbia, on both sides of the Nehoialpitkwa, rise to an average height of 6,000 and 6,500 feet, with occasional peaks 1,000 feet higher. Their summits are broad and flat, the ascents very gradual, though broken by escarpments of rock. On the right bank of the river they are often denuded of soil, but still show in horizontal lines of the larch, or tamarack, the remains of elevated terraces. These trees are, in the autumn, conspicuous among other coniferæ by the yellow hue which their leaves assume

before falling; and, perhaps from their requiring a greater depth of soil than the firs, seem particularly to affect the terraces and summits. The southern and eastern slopes are less timbered and more grassy than the others.

The terraces throughout the valley are well marked. The descent to the Schainks is by four of these benches, the heights of which, above the crossing of that creek, were, of the first, 767 feet, of the lowest, 363 feet; or, respectively, 3,452 and 2,685 feet above the sea. In the basins of the main stream they are lower and more extensive; but at the mouth again, where the fall is more rapid, they regain their height. Modified terraces are visible in various places at from 500 to 600 feet above the river. The débris and wash from the hills form slopes towards the river, sometimes at a pretty steep angle, extending to the edge, or crossing midway in the terrace, according to its width. Large masses of rock are scattered over them, but evidently all derived from the neighboring mountains. Almost every form of modification is to be found well marked along this river.

The rocks on the mountain-sides, to a great height, appeared often to have been smoothed by water or ice. If by the latter, it was possibly the ice of the arms or bays, and not of glaciers, though these may have been, as elsewhere, covered by detritus.

Many of the appearances of glacial action, attributed to fixed glaciers, may, it appears to me, be rather due to ordinary winter-ice, at a period of greater elevation of the water or depression of the land. I saw no transported boulders in this valley, though the terraces are often strewed with blocks rolled down from the adjacent hill-sides.

The geology of this range, which, following Prof. Dana, I have considered as a continuation of the Blue Mountains, is singularly confounded. Leaving Lake Osoyoos, we found, at the foot of the divide, sienite cropping out beneath quartz rock. The summit was of

a dark-colored granite, decomposing rapidly on exposure, and descending to the Schainks; besides the granite, boulders of blue altered slate and a porphyritic trachyte were abundant in the stream. In following the Nehoialpitkwa down, a great variety of rocks were observed,—granite, trap, porphyry, gneiss, and laminated quartz, talcose actinolite and mica schist, as also limestone. A short distance above the southerly bend of the river, on the right bank, the granite breaks through the gneiss, forming, as it were, dikes or long hogbacks running down the side of the mountain, and conspicuous by their lighter color.

Gneiss enters much more largely into the constituents of these mountains than it does into those of the Cascades. In particular, it forms the walls of the cañon near the mouth of the river, where it is nearly horizontal. The limestone, which becomes more abundant in approaching the Columbia, is thickly bedded, crystalline, and appears to overlie the others.

The search for gold upon this river, consequent upon its discovery upon the Similkameen, resulted in finding "diggings" upon Rock Creek, a stream coming in from the north, near the first crossing of the parallel, and to the foundation there of a village, or miners' settlement. The excitement was of somewhat longer duration than at the first-mentioned locality, but has since subsided in favor of the mines more recently discovered in the Nez Percé country.

The Nehoialpitkwa valley contains some land suitable for cultivation in the basins and low plateaux, but its chief value is for grazing. The best part of it lies north of the parallel. The timber in the valley itself is mostly the red or Columbia pine (P. ponderosa), larch, and yellow fir; on the mountains, the larch, pinus contorta, yellow and balsam firs. The line of forest reaches a greater elevation here than on the western Cascades. Mr. Custer found pines and balsam firs in full vigor at 7,000 feet.

COLUMBIA RIVER.

The falls of this river near Fort Colville (generally known as the Shwoyelpi, or Kettle Falls, from the "pot-holes" worn in the rocks) are about twenty-five feet in height. The obstruction is formed by a thick bed of laminated quartz, which here crosses the river, having an easterly dip of 20°. This spot is one of the great fishing-grounds of the neighboring Indians, who annually assemble, in the summer, in large numbers. The falls are not sufficiently perpendicular to stop the passage of the salmon, but check them enough to enable the Indians to secure incredible numbers.

Following the Columbia from Fort Colville to Fort Shepherd, a little above the forty-ninth parallel, slates and limestone prevailed, with intrusions of trap, and an occasional outcrop of granite. The slates were much broken up and altered, and no general dip could be recognized. The limestone was of various quality, the prevalent form being a fine-grained and compact black rock. It was also found breaking up into wedge-shaped fragments and splitting into large plates. This last was of various colors, pink, white, and dark gray. Near the mouth of Clarke's Fork the boulders were sienite.

Gold was found several years ago in Clarke's Fork, and in the Columbia, at its mouth, and this discovery led, I believe, to that of the Frazer-River mines. It was chiefly obtained from the bank, or lower terrace, and was very fine, requiring mercury to collect it. Farther up Clarke's Fork it was rather coarser. The prospects, however, were not flattering, and in 1859 the placer was already nearly abandoned.

Excepting the terraces, which are seldom of any width, the Columbia has no valley above Fort Colville. From there to the mouth of Clarke's Fork it is lined on both sides by hills of very uniform elevation, which sometimes, for miles, present an almost unbroken wall.

In the whole distance no tributary larger than a brook

FALLS OF THE COLUMBIA—NEAR FT. COLVILLE.

enters from the east, and on the west but a single stream, a creek called the Yornetsin, or White Sheep.

In the wider parts of the river-bed extensive flats and stony bars occur; elsewhere it runs through a trough of sloping boulders.

At Fort Shepherd, about a mile above Clarke's Fork, the rise of the river, as indicated by this trough, is twenty-five to thirty feet, and the boulders range from a foot to three feet in diameter. The tremendous force of the sand-laden water, during the freshets, is shown by the rocks in litter, which are polished and worn into deep kettle-holes, as they are at the falls below Colville.

About twenty-five miles above Fort Colville are the "Little Dalles," a narrow cañon in the slate rock, where the river is compressed to a width of perhaps fifty yards. This word *dalles*, by the way, which occurs frequently on the maps of Oregon, is a Canadian term, signifying a trough, and is usually applied to cañons in the bed of a stream, not to the great fissures or excavations through which its course lies.

The width of the Columbia at the mouth of Clarke's Fork is about 300 yards. That branch enters at right angles through a gorge in a wall of hills some 1,200 feet high.

Its course for many miles above its mouth is that of a roaring torrent, and it falls directly into the main river by a cascade of twelve or fifteen feet in height.

The terraces of the Columbia are well marked and continuous for considerable distances. At one camp below the mouth of Clarke's Fork the base was elevated about eighty feet above the river. From the opposite and corresponding one, the second rose to the height apparently of 500 feet, and still above that a line of larches indicated the remains of a third.

The lower terraces are wooded with pine, larch, and fir, and the two latter line the hills. The fact that these terraces do not slope with the river, but descend by

steps, is well illustrated between Fort Colville and Fort Shepherd.

FROM COLVILLE TO SINGAWATEEN.

The valley of the Slawntens, or, as it is locally called, Mill Creek, which enters the Columbia just below Fort Colville, and of the Chemakane, a small stream heading with it, and emptying into the Spokane, form another of the coulées before mentioned, of which there are a number running through these hills. The first rises from the base plain of the Columbia, by a terrace, to a height of some 380 feet above the river, and the divide between the two is between 500 and 600 feet, the Chemakane valley dropping by another terrace to the level of the Spokane. Of, course these streams excavate deep cuts at their exit.

The Mill Creek valley has been for many years occupied by employés of the Hudson's Bay Company, chiefly Canadians and half-breeds, and is, in fact, the only settlement in the central part of Washington Territory. Since the establishment of the depot by the escort of the Boundary Survey, however, quite a number of Americans have come in, and it would require the protection and encouragement of a military post, for a few years only, to give a character of permanence to the population. The soil of the valley is rich, consisting of a deep, sandy loam, with a subsoil of sand. That of the terraces is, as usual, gravelly, underlaid by blue clay at a depth of ten or fifteen feet, but the hill-sides are also capable of producing grain. The best crops, at present, are oats, barley, peas, and roots.

The wheat hitherto raised has been summer wheat, and the seed, as indeed that of everything else, has been suffered to run out. The new seed brought in by the troops, consisting of potatoes, beets, and other vegetables, produced abundant crops.

Winter wheat would probably succeed well, as the snow lies continuously, and would prevent freezing out.

Of the fruits, apples alone could thrive here. The nights in summer are said to be warm; but the season is very short, early and late frosts occurring.

The Chemakane valley, which was, at one time, the seat of a mission, also contains some very good land.

The limestone, which forms so prominent a constituent in the mountains west of the Columbia, appears to find its limit in the range of hills bordering it upon the east, none having been observed beyond the Slawntens and Chemakane. It here overlies quartz rock, which is, on the other side of the river, frequently laminated.

Around the depot, the quartz was chiefly visible in the western and north-western escarpments of the hills; and, at the mill at Peptahshin Creek, the dam is formed by a ledge of quartz dipping northward at a steep angle.

Boulders of sienite, some of them ten or twelve feet long, were noticed scattered over the hills east of the depot, a fact remarkable in connection with their scarcity through this country generally.

The explanation, I presume, is to be found in the fact that the valley of the Columbia, and the coulées which intersect these hills, admitted the passage of transporting ice, which the mountains elsewhere intercepted.

East of the Slawntens and Chemakane, and between them and Clarke's Fork, the rocks observed were a light-colored granite, sienite, gneiss, and quartz, the latter very generally either laminated or bedded. The granite itself was frequently divided by parallel planes, in such wise as to present the appearance of stratification, and in places separated into cuboidal blocks, so as to resemble a wall laid up in horizontal courses.

Upon the Spokane the basalt of the great plateau makes its appearance. This stream has been mentioned as the dividing line between the trap and the granite and other associated rocks, and substantially it is so; but the skirts of the former, nevertheless, cross it in places, overlying the granite.

The bluffs of basalt are often eroded into large rounded masses, and the rock, still farther disintegrating, falls apart in irregular pieces, forming mounds, from the summit of which points or chimneys of still coherent material project.

The terraces of the Spokane are conspicuous for their elevation rather than their number. They are formed almost altogether from the white quartz and felspar of the decayed granite.

Between the Little Spokane and the Cœur d'Alêne prairie, upon a plateau of trap elevated some 500 feet above the latter, an outcrop of argillaceous slate was observed overlying the basalt. The Cœur d'Alêne prairie, which is situated on the main Spokane, here called the Cœur d'Alêne River, is about twenty miles in length by three to five wide.

This valley, which is one of the most beautiful in the territory, is the favorite resort of the Indians of both tribes, who pasture their horses on the bunch-grass with which it abounds, and have their patches of grain and vegetables under the hills which border it. No great portion, however, is capable of cultivation.

The prairie is slightly terraced, and, in places covered with rolled gravel, precisely like that of sea-beaches. Its elevation is approximately 2,200 feet above the sea.

In the valley of the Little Spokane there is a considerable body of arable land, and wheat and potatoes both thrive well. The climate of the Spokane is much milder than that around Colville or on Clarke's Fork, and the season proportionately longer. The grass on the 3d of April was already becoming green, and early spring flowers were appearing, while at Colville depot the snow had hardly left the ground.

From the prairie, the Cœur d'Alêne Mountains, on the south, and Bitter Root, on the east, bound the river, both at this season topped with snow. The river, which, emerging from the lake, winds through the whole length

of the prairie, a little below it, makes a fall of 100 feet, the obstruction, according to Dr. Cooper, being gneiss lying horizontally, through which it has cut a narrow cañon, with vertical walls, a mile in length. Gneiss, granite, and pegmatite form the principal rocks on the north side of the prairie also, where they run into one another in the most confused manner.

The valley of the Cœur d'Alêne is connected with that of Clarke's Fork by a wide coulée, the greater part of which is a plateau, elevated some 600 or 700 feet above the former. It bears indubitable evidence of deposit or arrangement by water, and unquestionably, at some former period, opened a communication between the two.

This plateau is thickly wooded, and snow lay to a depth of two or three feet, deepest as we approached Clarke's Fork. On reaching Pekoula Lake, the route to Clarke's Fork descends an abrupt terrace of 225 feet, and follows a lower bench some fifty feet above the water. Beyond this the descent of the outlet was gradual to the Singawateen crossing. The ranges on either side of this valley rise to a considerable height, the shape of the mountains being in general of the rounded outline common to granite formations, in many instances with dome-shaped summits and crowning knobs, all wooded except on the highest peaks. On the west side, or towards Colville, one summit called Chekolesum, probably 7,000 feet in height and destitute of timber on the top, is the Ararat of the neighboring Indians, to which they fled in the great rising of the waters. Mr. Angus McDonald, of the Hudson's Bay Company, informed me that a petrified tree, said to be cottonwood, lies upon its summit.

Clarke's Fork, from the Katispelm Lake to Singawateen, a distance of fifteen miles, has itself almost the character of a lake, especially in the freshet season, its channel being wide and deep, and its current comparatively sluggish. From there to the old mission of St. Ignatius, thirty-five miles, it is swifter, and below that

point it runs through a cañon broken by falls and rapids, and impassable for canoes. Even the salmon do not ascend it. The only alluvial land below the lake is an occasional strip of meadow, flooded during the summer. The terraces are composed of a very stiff and refractory whitish clay, utterly unfit for cultivation. The country is everywhere timbered and vegetation exceedingly late, frost and snow not entirely disappearing from the woods until the end of May.

The rise of the south branch, at the junction of the Bitter Root and Hellgate forks, commences about the 1st of April; that of the north branch, on Flathead River, I could not learn, but it is undoubtedly later somewhat.

At Singawateen the rise commenced about the middle of April, and the water reached its stand-point June 17th, the height being sixteen feet. On the 17th August it had fallen to within four and a half feet of its spring level.

The rocks between the crossing and the lake were almost entirely granite, composed of light-colored felspar in large crystals, white quartz, and a small proportion of mica. Some gneiss and diorite were also observed.

Katispelm, or, as it is also called, Pend'Oreille Lake, is not an expansion of the present river, but fills a considerable valley transverse to its course. It is forty miles long by seven in greatest width, very deep, and lined on both sides by mountains.

A depression, or coulée, similar to that between Singawateen and the prairie, extends from its head, south toward the Cœur d'Alêne Lake, and another north from its lower end to the Kootenay, at Chelemta. This last is drained in either direction by streams which interlock with one another. It is continued directly north by the course of the Kootenay River as far as Flatbow Lake.

Barometric measurements give the following as the

approximate relative heights of these rivers and their connecting valleys on north and south lines:

Elevation of Cœur d'Alene Lake	2,230	feet.
Elevation of Katispelm Lake	2,210	"
Height of former over latter	20	"
Elevation of Spokane River at the prairie	2,170	"
Elevation of Clarke's Fork at Singawateen	2,140	"
Height of former over latter	30	"
Elevation of Katispelm Lake, as above	2,210	"
Elevation of Kootenay River at Chelemta	1,770	"
Height of former over latter	440	"
Elevation of divide between Cœur d'Alene prairie and Singawateen	2,580	"
Elevation of Spokane River	410	"
Elevation of Singawateen	440	"
Elevation of terrace opposite Chelemta	2,360	"
Elevation of terrace above Katispelm Lake	150	"
Elevation of terrace above Kootenay River	590	"

It will thus be seen that the elevation of the rivers decreases as we proceed northward, and that a comparatively slight erosion would direct the water of Katispelm Lake into the Kootenay. On the other hand, the terraced deposits, so far as observed, are higher at the northern than at the southern end of the coulées, as, for instance, at the Kootenay than on the Katispelm Lake, and this not merely in comparative, but in actual height. On the supposition of recession southward of the sea, this would be naturally the case.

From the configuration of the country, it would seem probable that other similar depressions, running in conformity with the mountain-chains, connect the Kootenay with the waters of Clarke's Fork above the points here mentioned, and these would appear to be natural valleys,

formed during the original upheaval of the mountain-ranges, and filled up by detritus during the submergence of the country. The remarkable feature is, that the rivers should have cut out channels through these ranges, instead of following the troughs.

Mr. Darwin has noticed similar facts in some of the mountain-basins of South America.

Passing from the lake to Chelemta by this valley, we found the bottom-land heavily timbered, and the upper terraces, which are sandy, exhibiting the open grooves peculiar to the Red River. The mountains on either side are granitic; but in the bed of the creek, running through the Kootenay, were large boulders of sandstone, probably tertiary.

KOOTENAY RIVER.

The valley opens upon the Kootenay at a point where, having broken through a range of mountains in a course from east to west, it turns suddenly northward, as it were in continuation of the coulée. Looking down the river, from the high terrace in which the latter terminates, a superb view presents itself in the early summer; the entire valley, from mountain to mountain, being flooded, leaving only strips of more elevated timber-land, small islands, and the tops of trees above water. On the opposite or right bank, the course of the stream can be followed by the balsam poplars, and willows, which border it on either side, as it crosses nearly to the farther side of the valley, and there winds down in a serpentine course, presenting the curious spectacle of two parallel rows of trees rising in a broad expanse of water and inclosing a canal.

It is such immense reservoirs for the melted snow of the Rocky Mountains that supply the body of water which continues to pass through the Columbia and Frazer rivers until late in the season. The accompanying views, one taken from the point of our first approach during the freshet, and the other some twenty miles

KOOTENAY VALLEY IN THE FRESHET—FROM OPPOSITE CHELEMTA.

below, after its subsidence, will give a better idea, however, than mere description. The valley is from two to five miles wide. The terrace, which here borders it, is single, and rises to a height of 500 or 600 feet, but on the right bank is greatly modified and broken by the protrusion of the rock on which it rests. The mountains reach an elevation of about 4,000 feet above the river, or 6,000 above the sea, some higher points being above the forest-line. Patches of snow are visible upon them till the beginning of July. They are massive, with moulded summits and sweeping outlines, but their sides present many abrupt and deep ravines. Except the river-bottom or interval, which is meadow, the whole country is timbered.

The river had already commenced to fall, and, as estimated from the banks, the subsidence had been about nine feet. The difference at Chelemta between the highest and lowest stages, as indicated by a gauge, is little short of thirty feet. As might be supposed, there is no arable land in the valley, those portions where the soil might admit of cultivation being overflowed during the early summer. The terraces are sandy, but afford good grazing in the open timber.

Following down the right bank of the Kootenay to the parallel, the rocks were chiefly granitic, varying in the proportions of the material at different localities, mica being always sparingly distributed. Some gneiss was also noticed. Leaving the river and crossing to the Moosyie, a change in the geological character of the country is at once perceptible.

The range which is cut through by the Kootenay in its great bend, as will hereafter more particularly be noticed, is a northerly continuation of the Bitter Root chain, and as such the true axis of the Rocky Mountain system, though not its watershed.

It forms the divide between the crystalline and metamorphic rocks of the western side and the stratified rocks

of the eastern ranges, though here the latter are themselves much broken up, and, to a great degree, metamorphosed. Of their age and relative position I could form no positive opinion. I found no fossils whatever, but in lithological character they resemble those of the eastern mountains. Stratified quartz, blue and green slates, sandstone and limestone,—the last, apparently, uppermost,—now overlie granite and diorite.

All these are greatly upturned, and no consistent dip could be ascertained. This character prevailed to the head of Moosyie, in about lat. 49° 30′.

The valley of this stream is very narrow, and lined with rocky-timbered hills. It has the character, so often referred to, of being flat and sluggish at its source, with marshy ponds,—lower down rapid, and cañoned at its mouth.

The terraces are marked throughout, and, which is rare to the westward, strewed with boulders and irregular blocks. The Moosyie Lake is simply an expansion of the stream, pretty, but with no marked features, and divided by marshes. The hills on each side are some 1,200 or 1,500 feet above it, rising in rocky benches, sandstone being the prevalent constituent.

On the right bank are very regular walls of strata, varying in thickness from an inch to several feet, composed of sandstone, greenish slate and limestone. The divide between the head of the Moosyie and the Kootenay is not over 600 feet above the former.

In descending to the Kootenay the country again becomes open, gently undulating table-land, with gradual slopes, and grassy spots on the hills. At the foot is a prairie of some extent, level and surrounded with lacustrine terraces and low-timbered hills, from which the first view opened of the Rocky Mountains.

The range seen from here is that which separates the Kootenay from one of its branches, known as Elk River. It is steep and rugged, with crests of bare rock, and des-

titute of timber, and the lines of stratification are visible from the western bank of the river.

Snow was seen only in patches (August 21st), though the higher points were some 8,000 or 9,000 feet above the sea.

The soil at Joseph's Prairie, so called from its Indian owner, is good, but very wet in the spring. We saw here some patches of wheat, which looked well for Indian cultivation. The natives had a large band of horses and cattle, including cows, which they milked.

The route hence down the Kootenay at first ran some distance back from the river, in a sort of lateral valley, dotted with ponds and small lake-basins, but afterwards approaching the bank more nearly, as the country became broken. The same general character of rock prevailed throughout, greatly disturbed, and dipping in various directions. Eruptions of trap and porphyry have, in places, broken through them.

The valley of the Kootenay, in the neighborhood of the parallel, is of considerable width, but of very irregular surface, as indicated by the accompanying profile, constructed by Mr. Hudson.

On the western side, a series of parallel ridges rise gradually in succession to the base of the mountains. They appear to have once constituted a series of terraces, resting upon outcrops of rock, which have been eroded by currents in the direction of the stream. On the eastern side of the river, the country is more open and less disturbed, but with some of the same features.

Between the parallel and the mouth of the Akonoho are quite extensive level plateaux, terraced, constituting the Tobacco plains, so called, if the name can really be given to anything but a small patch. It is said to have been originally on a small tract of land near the Hudson's Bay trading post, on which some tobacco was once planted; as generally applied on the maps, it is simply absurd.

There is, throughout, very little land available for tillage, the terraced country being sandy or gravelly.

The Indians of the neighborhood raise some wheat, turnips, potatoes, and parsnips, generally selecting recesses of the foot-hills, or other favorable spots. Bunch-grass covers the open country, and the grazing is very good.

As at Joseph's Prairie, we found the natives in possession of numerous horses and some very good cattle.

The terraces bordering the Kootenay here are distinct, two, or sometimes three, in number, and reach a height of 600 feet. The highest are generally modified, and far from continuous.

Terraced slopes, in some instances, run up into the recesses of the mountains to a much greater height. Mr. Hudson counted, on one of these, fourteen different levels.

KOOTENAY RANGE.

The valley of the Akonoho is quite wide near its opening into the Kootenay, and, like that of the latter, terraced, the plateaux extending up it to an elevation of 4,000 feet above the sea. Ascending the stream, the pass narrows, and is shut in by mountains. The summit is about 5,200 feet. In the lower valley the rocks were chiefly sandstones, with some slate, in some places rendered metamorphic by the intrusion of trap. Upon the summit they were a red micaceous sandstone and red shale, interstratified with green slates. These latter are sometimes glazed on the surfaces of lamination, sometimes separated by their partings of mica, and occasionally are calcareous.

Ripple-marks and sun-cracks are abundant and exceedingly distinct. Another class of marks, frequently seen, is of parallel lines sharply cut, as if with a graver's tool, and sometimes crossed at right angles, but of inconsiderable depth. They probably indicate that joints had

commenced to form. Descending on the east side, the sandstones prevail for some distance down; and among the fragments rain-marks, and some very obscure forms, conjectured by Dr. Newberry to be fucoids, were abundant.

These rocks were succeeded by limestone, which forms in one place a precipitous wall of 700 feet in height above the creek. At the foot of this the first distinct organic remains were seen in a species of coral zaffrenites, and a little farther a number of casts were collected of spirifer, athyris and productus.

All these were found in loose fragments of limestone, and, although their neighboring origin was unquestionable, none were detected actually in place. An examination by Mr. Meek refers them, without doubt, to the carboniferous period, as will be seen by his report; but their exact place in the series is uncertain.

No traces of coal or coal-plants were discovered. Lower down the stream, and apparently below the limestone which contains these fossils, is an outcrop of sandstone, said by Dr. Newberry to be the exact counterpart of the Potsdam sandstone, as it occurs farther south in the Rocky Mountain ranges.

As regards the dip of these rocks, taken as a whole, no general rule could be ascertained. They are horizontal, or nearly so. At the summit they dipped N. E. 25°, and elsewhere they are inclined in various directions. The upheaval of the range is undoubtedly from the eastward, but there seem to be several foldings. The red sandstones and slates appear to overlie the limestone.

The valley of the Akinesahtl, or Upper Flathead River, near the parallel, though of some width, has no interval land, being occupied almost entirely by the terraces. The uppermost of these consist, instead of rolled gravel, almost entirely of angular fragments, the débris of the adjacent hills.

The first view of the eastern range of the Rocky

Mountains, as presenting itself on emerging from the pass into the valley of the Flathead, is that of a number of detached masses rising above a line of foot-hills. These are, in fact, the ends of spurs or ridges which break off from the watershed, or in some cases of almost isolated groups. The highest points of this range, which here are about 10,000 feet above the sea, are not upon the divide, but upon these outliers. Their general shape is ragged and precipitous, with sharp crests or points. Their altitude, their striking forms, and the various colors displayed in the rocks which compose them, unite in these mountains the highest elements of beauty and grandeur.

The pass through this range leads up a creek which heads, in the main divide or watershed, with one of the feeders of Belly River, the southern branch of the south fork of the Saskatchewan. Two remarkable mountains,—Kisheneton, on the north, and Kishenehu, on the south, the latter a double peak,—form its western portals. The general material of these mountains is, on the western side of the range, sandstones and shales of various colors, from yellow to deep-red, greenish slates and limestone.

Mr. Alden, who ascended one of the peaks, describes the alternations as follows: The base was covered with débris to the estimated height of 1,500 feet above the level of the creek, where the rock was red sandstone. Over this was a belt of the same rock, metamorphic, and in waved or contorted strata, 150 feet thick, succeeded by 500 feet of green slates and red sandstones interstratified; then again by red sandstones 500 feet, the summit, to a thickness of 1,500 feet, consisting of an ochre-yellow earthy shale.

The other peak of the same mountain, on the contrary, was of a light-drab sandstone at the base, and above composed of green and red strata to a thickness of 600 feet, and then of red sandstone to the summit.

The foldings, or plications, of the strata through this

range are evidently on a vast scale, and it would be idle to attempt unravelling them in a single and hurried passage. As a general thing, it appeared to me that the limestones occupied the lowest position, and the earthy red and yellow shales and sandstones the highest.

In ascending the pass, I found a thick bed of trap and greenstone porphyry, intercalated between strata of sandstone, upon one of the mountain-sides, and elsewhere noticed curved and contorted strata, evidently the result of other intrusions. Ripple-marks were everywhere abundant. I met with no fossils; but at Camp Akaminia, on the southern fork of Kishenehu Creek, Mr. Hudson discovered the singular impressions figured by Dr. Newberry, which cover large slabs of rock. Their character, however, is not sufficiently determined to afford any indication of the age of the foundation. Low terraces bordered the valley almost to the foot of the divide.

The summit, or watershed proper, is here continuous for at least several miles, and its dip is uniform to the S. S. W., or perpendicular to the trend of the range, in which direction it presents a gradual slope, while to the N. N. E. it plunges at once into the valley. The elevation is about 6,000 feet. A few stunted pinus contorta and balsam firs only grow on the summit, but their diminished size seems to be owing to scanty soil and exposure to wind, as they reach a height at least 500 feet greater on the adjacent mountains.

The divide is but narrow, and the view to the west extended down the valley of the Kishenehu to the Flathead, and on the east through the gorge of another creek to that of a larger stream, of which it is a feeder.

It embraced, on either hand, a vast area of mountains of the most picturesque forms, and singular for their variety of coloring and the linear marks of stratification.

Several glaciers lie upon the summits of the higher peaks, the most conspicuous of which, on Mount Kintla, is apparently some two miles in extent.

No valley glaciers exist so far south as the forty-ninth parallel.

Descending the pass to the eastward, the mountains rise on either side with steep slopes of débris, crowned by precipices.

Greenstone was mixed with the boulders in the stream, and large masses lay scattered through the ravine. Its origin I could not trace.

The stratification of the other rocks was but little affected; but it was, in many places, metamorphic. Limestone prevailed to a much greater extent than west of the divide, apparently beneath the sandstones; and, towards the foot of the pass, quartzite seemed to underlie that also.

Emerging from the gorge of the creek, between two remarkable and precipitous cliffs, the pass enters a small valley, terraced, and with fine grass. Its course was at first southerly, and then eastward for about three miles, when it opened at once upon the plains of the Saskatchewan. On the north, the mountains here terminate abruptly, rising at once in steep, rocky declivities from the prairie. Southwards, an outlier is separated from the main range by a long, narrow and very picturesque lake, the waters of which also enter Bow River. The elevation of this is about 4,000 feet above the sea.

Terraces run along the eastern base of the mountains, from fifty to seventy-five feet above the creek. No timber is visible, except in the bottom, where there were stunted aspen and poplar, willows, and the service berry; and thus suddenly does the scene here change from the mountains and forest of the Pacific to the vast, treeless, and almost level expanse of the central region.

On so imperfect an examination of these great mountain-ranges, and without fossils, from numerous localities, it would be presumptuous to attempt any positive establishment of their geological age, or to unravel the complications of their structure. No crystalline or even true

hypozoic rocks were seen in place in the two eastern ranges, upon which to found a basis of reasoning.

The opinions arrived at, from such study as I was enabled to make, are chiefly conjectural. A much better judgment could be formed on a route from east to west than in the contrary direction, as means of comparing their lithological character, at least, with known formations, could thus probably be found.

I suppose the range crossing the Kootenay, at the falls, and continuing northward through its great bend, which I have termed the Moosyie range, to be azoic, and that the quartzites and highly quartzose sandstones of the Kootenay and watershed ranges are also of that formation.

The existence of carboniferous rocks in the Kootenay Range has been shown, and it is highly probable that both the Silurian and Devonian systems are embraced between that and the azoic, while the earthy shales which crown the water-shed are probably triassic.

From Tobacco Plains to Chelemta.

Descending the Kootenay River from the parallel, the valley narrows, and rocky escarpments occasionally show on either side. The route led down the left bank as far as the great bend of the river, sometimes over elevated terraces, sometimes over broken country covered with slides from the mountains.

The general dip here seemed to be to the N. E., often at a very low angle. Limestone formed the material of some of the bluffs, and in one place I noticed it smoothed and worn, as if by the action of water. Crossing to the right bank, no general dip could be detected. Ripple-marks and sand-cracks were observed in abundance as far down as the falls.

The falls of the Kootenay occur at its passage through the range of mountains which I have assumed as the continuation of the Bitter Root range. The bed-rock

here dips easterly, at an angle of apparently five or ten degrees, the water rippling over the edges of the fractured laminæ; and then the main body, sweeping diagonally across to the right, plunges into a chasm, producing a very pretty effect. The river, for some distance below, is cañoned.

The rocks are of the same character as above, but metamorphic and greatly contorted. Against the western side of the mountains lie terraces elevated some 300 feet above the river, and apparently stretching back for some distance. At the crossing of the Yakh, a very tough hornblendic rock appears, for the first time, among the boulders, probably underlying the others.

Approaching Chelemta, the bottom widens out into flood-lands, and the terraces reach a height of 700 or 800 feet above the river. The rock there, as before mentioned, is granite.

SPOKANE RIVER TO THE DALLES.

The great plateau inclosed between the Spokane, Columbia and Snake rivers, and extending eastward to the base of the Cœur d'Alêne and Bitter-Root mountains, is composed entirely of basalts and lavas, overlying granite, which is visible on its northern skirt in the bluffs bordering the Columbia.

Its surface is greatly broken and intersected by coulées and cañoned valleys. The most noted of these, the Grand Coulée, was not on the route of the party. It has been described by Lieut. Arnold, U. S. Army, in volume 1 of the Pacific Railroad Reports. No timber is found on these plains, except along the northern skirt of the Grand Coulée. The soil is generally thin and poor, without arable land, though there are tracts of good grazing; but the exposure to winds and the depth of snow compel the withdrawal even of the Indian horses to more sheltered situations during the winter.

The plateau seems to have been formerly covered with drift to a considerable depth, of which remains exist in some rolling country on its northern edge, and elsewhere in low table-topped hills, but the greater part is almost wholly denuded.

Basaltic walls, rising in steps, line the cañons, and here and there crater-like basins and rifts on the surface indicate the sources from which the lava was emitted.

As a general thing, the upper beds are more vesicular and less massive than the lower, and the columns and nodules smaller. The lower form large irregular blocks and large pillars, often shaly in structure. Throughout all this country the general position of the beds is apparently horizontal. The elevation of the plateau is, at the crossing of the Spokane River, about 2,500 feet above the sea, whence there is a gradual falling off southward to the Snake River.

The mountainous country lying west of the Spokane plains, or between the Columbia and the Cascade range, was described in my report to Capt. McClellan in 1853, and was not revisited by the expedition.

Below the Winatsha or Pisquous, the rocks are exclusively volcanic, basalts and lavas, over which, in places, lie thick beds of tufaceous deposits and infusorial earths. Some of them are described in the accompanying report of Mr. Edwards. All which have been examined prove to be, as indicated by Professor Bailey, of fresh-water origin.

South of the Columbia, the high basaltic plateaux continue intersected by the valleys of the streams emptying into it, of which those of the Des Chutes and Mahagh, or John Day's River, are the principal.

The former has been fully described by Dr. Newberry in his report to Lieut. Williamson, and will serve as a type of the whole. Between the Snake River and Fort Walla Walla, however, the basalt does not attain the usual elevation, but is only visible in the ravines.

The country is there a sea of rolling hills, which in their uniform height and contour, and the color imparted to them by the bunch-grass, resemble the sand dunes thrown up on coasts, though they are much more eroded.

The valley of the Walla Walla is here broad and level, the general soil sandy, like that of the hills, but along the streams there is a very productive black mould. All sorts of vegetables thrive well, and Indian corn ripens; but, from the limited extent of first-class land, it is better suited to gardening and grazing than to farming. The lower part of the valley is sterile and worthless.

The route down the Columbia from the Snake is a picture of desolate grandeur. High basaltic bluffs, or hills of drifting sand, destitute of trees, wall it on either side. The shores are lined with black reefs of basalt, their surfaces ground by the passage of ice, or the wear of the sandy waters in the freshet. The course of the river is broken by rapids, which are not, however, impracticable to light-draught steamers, but below the mouth of the Des Chutes a perpendicular fall of ten or twelve feet effectually bars passage, as does also the shoot at the Dalles. From these to the Cascades, the stream is deep and still. This last obstruction is obviously recent, and caused by a slide of rocks from the mountain, which has dammed back the water, overflowing its banks and submerging skirts of timber, the stumps of which are still visible beneath the surface.

Several members of the party, on the conclusion of the survey, ascended the Snake River in a small steamer from Walla Walla to the mouth of the Kooskooskie, and that stream to its first forks, about forty miles.

Gold had recently been discovered in the mountains forming the western series of the Bitter-Root range, and the influx of miners into what has since proved a very productive country had already commenced.

The metal has since, it is reported, been also found in

Burnt and Powder rivers, which drain into the Snake, from the eastern side of the Blue Mountains.

The country lying on either side of the Snake has been almost entirely unexplored, nor has any survey been made of the river itself between the mouth of the Kooskooskie and the Malheur, a distance of two degrees and a half of latitude. The formation is everywhere basaltic, and of the most desolate and forbidding character.

The Snake pursues its foaming course through a cañon which attains from 1,000 to 1,500 feet in depth, the walls resembling, though on a far grander scale, the Palisades of the Hudson; on either side, a steep talus of fragments being surmounted by a vertical precipice of black rock.

Standing on the brink, the eye sweeps a vast plain yielding no other vegetation than the artemesia and its associated shrubs, and sees the windings of this great excavation narrow, in the distance, to a line.

Here are some of the grandest features of natural scenery on the continent. The "American" and "Fishing" falls have been described by various travellers; but, as the usual trails avoid the river in places, others, and among them the Shoshone Falls, second to Niagara only in volume, and possessing features to which that can lay no claim, have escaped notice.

Crossing the country in 1849, I was one of the first party, Indians and trappers excepted, who ever visited them. They are situated eight miles above Rock Creek, or about 100 miles below Fort Hall. The river here bends round a vast isolated mass of basalt, and falls, by two or three cascades, into a wide and still basin, pausing, as it were, before it takes its final and unbroken plunge. So deep is the chasm in which it flows that the sound of its fall is barely heard upon the level of the plain.

We led our horses, by a steep and difficult path, to the margin of the basin, and thence succeeded in reaching the river at its foot. The height we calculated, by the cedars

which cling to the crevices of the rocks, at 180 feet; its width was estimated at 200 yards. The rock over which it poured was of argillaceous porphyry, upon which rested the basalt of the desert.

V.

NORTH-WESTERN NORTH AMERICA: ITS RESOURCES AND ITS INHABITANTS.

By J. T. Rothrock, S. B., M. D.

READ DECEMBER 17TH, 1873.

Of all the strange events of this century, nothing is half so wonderful as the growth and increase in material prosperity of the United States. It seems as though the latent unrest of all the races, which now blend in one composite race, had suddenly become awakened, and with a new energy undertaken to redeem, by a mighty effort, this entire continent from barbarism. In the true spirit of prophecy, a poet long since told us—

"Westward the course of empire takes its way."

It was but history to assert

"The four first acts already past."

To-day Berkeley's prophecy is as true as was his history in the year 1700. The years elapsing since (with almost divine forecast) the prediction was made have delivered themselves of their great burden, and the world now may well stand amazed in contemplation of such a progeny.

To leave the remoter past and come down almost to our own day, who has not read the story of Astoria? We may dwell over the recitals of sufferings, so vividly portrayed there, as over the pages of Ivanhoe, half convinced that though there might be much of truth, there was more of romance in the volume. Yet those of us who

know something from personal experience of frontier life can tell you that Irving did not overdraw the picture; that even within half a century the perils from Indians, from starvation, from the storms and streams, encountered by those whose hardihood led them to cross this continent, were all terribly real. But how changed to-day! The same great expanse of prairie still sinks in the dim distance below the horizon, and the same lofty peaks still mark the limits at which all westward rovers might well be content to stop; but the weary miles are transformed into pleasure-jaunts, and the most secluded and inaccessible mountain-retreats are opened to every sight-seer whose curiosity leads him thither. While we are shaking the dust of the eastern coast from our clothing, we are carried to the golden gate of California, and can watch the sun disappearing in the Pacific Ocean.

This, then, ladies and gentlemen, must be my apology for asking your attention during the hour in which I shall try to tell you something of that portion of our continent to which public attention is being so largely drawn.

In 1592, San Juan de Fuca, following our western coast, entered the broad strait that now bears his name. At its eastern end a magnificent bay stretches off far to the south. Its shores are covered with timber of fabulous size and in immense quantity. On either side (east and west) rise mountain-ranges on which, in cooler spots, the snow lingers all the year. Rivers, draining fertile valleys, come down through the mountain-gorges to empty into this bay. Here and there islands dot its quiet surface, and between them are deep, safe ship-channels which would float the navies of the world. The whole bay is one splendid harbor. It is now before the public as *Puget Sound.*

Being well known, let that be our starting-point. Going north along the valley of the Frazer, after leaving the flat grounds which have been reclaimed from the ocean by the sediment deposited by the river at its mouth, we enter

the mountains; spurs at first of the Cascade range, then the gorges in the main chain, through which the river has worn out a channel for itself. On either side high cliffs tower overhead, and shut off the sun, except when at high meridian. Add to this the deep monotonous green of the pine-trees, which predominates over every other color, and the scenery is gloomy enough to impress one sadly. Such an impression, however, can only be momentary, a passing shadow, that soon gives way to a sense of the absolute grandeur of the immense mountain-masses, which tower from 1,000 to 4,000 feet directly above.

The traveller may well wonder at the long-continued power exerted by the rapid current of the Frazer in this gnawing down of the channel to its present level. Imagination falls back in any attempt at grasping the mechanical equivalent which the force would represent, if for geological ages we substitute a day or a year, or any other period our minds can really and truly grasp. Hundreds of feet above the present river-level, we may see the same frettings and groovings that the water is wearing out in the solid rock under our eyes to-day. In the comparative calmness and quiet of its older age the current will drift, on the average, 100 miles a day from its head-waters to the ocean, and in the narrower gorges and rapids it fairly rushes along. We have, on this coast, no river that can at all compare with the Frazer, either in the grandeur of its scenery or the force of its current. With flat, fertile plains, equal in area to the State of New York, draining through numberless tributaries into the main stream, and with immense bodies of snow on the mountains at the heads of these tributaries, to melt away rapidly before an intense spring sun, you can understand why, in the gorges nearer the ocean, the difference between high-water and low-water marks is from forty to ninety feet, when this tremendous volume of water is thrown into the narrower channels. Yet, with all its present velocity of current, there was a time,

I have reason to think, when the Frazer, in common with the Nasse, Skena and Stukine rivers, was larger, and flowed at even a more rapid rate to their destination. Here and there along their valleys, terrace rises after terrace from the water's edge back to the mountain, and each terrace has its exact counterpart in height on the opposite bank. Every one of these elevations marks time when the rivers stood at a high level. To-day, over these grand accumulations of past ages, plants well known to the botanist bloom in a wonderful profusion. "Wild-pea vines" twine themselves through the dense grass until travel becomes tedious, as, hour after hour, one forces his way through the dense resisting mass. At intervals, over these terraces, are clumps of service-berry bushes, which furnish a fruit prized alike by Indians, birds, and bears; and here and there the cedars and twisted pines rise to the dignity of fully-grown trees. Even yet, the Frazer is wearing its rocky channel lower. Year by year new ledges of rock show themselves on the surface of Stuart's Lake, and prove convincingly that the outlet of the lake is being worn down by the unceasing flow of water over it, whilst on the lake-shores the willows are making their gradual inroads towards the vacant ground left by the receding water. These simple facts connect the present in a continuous line with the earliest terrace that skirts the mountain-foot, and show, amid all the changes impressed upon the landscape, the operation of one long-enduring law.

The river I have named rises among the Peak Mountains, which are hardly yet known by name even to inquisitive geographers. The mountains seem to fill up the valley left between the Rocky Mountains and a northern prolongation of the Cascade range. Imagine, if you will, an elevated plateau covered with here and there a clump of dwarfed, gnarled conifers, from the branches of which hangs the long lichen eaten by the Caribou; here and there a swamp, amid the cool waters of which thrive

plants belonging to a sub-arctic flora; here and there a diminutive lake, that shines, in the clear air of a great elevation, like a diamond, and the rest of the surface sprinkled over with high mountain-peaks, as though Nature had assigned them their positions in one of her most lawless moods. Between the bases of these peaks wind, hither and thither, narrow valleys, which represent the moiety that is left of the original plain, after mountain and swamps have claimed their shares. These valleys are intersected in every direction by great gulches, worn out deeply by the melting snows during the warm days of spring and summer, and all of which terminate at last in one common water-course that receives the accumulated product of sun and snow, to carry it off oceanward. Imagine a country in which these physical features are markedly grouped, and your ideal will resemble the heart of the Peak-Mountain region, where mere physical force has for all time seemed to run riot, and to shape the country without any regard to the future wants of civilized man; a region of warring elements, where sunshine and storm, clear skies and cloud overhead, perfect repose and the overwhelming onset of avalanches, are allowed to reconcile themselves as best they may. No one band of Indians regularly occupy the land, though many claim it; and when the wild tribes meet there during the hunting-season, whether they fraternize or fight depends entirely on their whims. Universal ruggedness has left its stamp on the region and its inhabitants.

Within a day's walk, here rise the tributary streams of the Frazer, Nasse, Skena and Finlay's branch of Peace River,—the three first constituting a triad which make their way to the Pacific Ocean; and the fourth, by reason of the mere accidental interposition of a water-shed, must wind a tortuous course, through one of the roughest mountain-regions on the globe, down to Athabasca Lake, east of the Rocky Mountains, and thence north, through Mackenzie River, to the far-off Arctic Ocean. For mile

after mile all of these rivers fall from precipice into chasm; now churning themselves into foam, now rushing along swiftly, but in comparative quiet, to an easier channel nearer the ocean-level. Much of the land on the banks of those emptying into the Pacific, and in their valleys, is fertile and well adapted to farming or grazing purposes, more especially so as they approach the ocean. Almost every sand or gravel bar will yield a trace (however small it may be) of gold. There can hardly be said to be a dividing ridge to the Peak Mountains; such as there is being lower by far than many of the scattered peaks on either side. The northern mountain-sides are, as a rule, precipitous, and, in many cases, show an absolute front hundreds of feet high. On the other hand, the southern declivities are as constantly more gradual. North of this mountain-system, the broad Nahanni plains stretch away far off, unbroken by any considerable ranges.

It is not a little remarkable, with all the other analogies existing between the western coasts of the Old and New worlds, that the similarity of mere coast-line should be so strongly marked, even in its minuter details. The fact is highly suggestive as an element in any speculations on the probable future of our western shores. It, indeed, almost amounts to more than a mere analogy, and is what a comparative anatomist would call a homology, *i. e.*, an essential identity of structure. To illustrate my meaning, allow me to remark that, under 60° of north latitude, we have at once the *flörds* of Alaska and of Norway. At latitude 80° N. are the western prolongation of the sandy sahara of Africa, and the equally barren wastes of Lower California. There comes a dropping-off to the eastward, in the Gulf of Guinea, just as our coast trends eastward, from Mexico to Panama. The English islands lie between latitudes 50° and 58° N., as do those of Vancouver's and Queen Charlotte's, while, as if to complete the analogy, we have the Baltic Sea of Europe

well represented by the Frazer River, and the Baltic is prolonged southward in the Gulf of Lübeck, just as the Strait of Fuca is prolonged south into Puget Sound, and the Peninsula of Denmark finds its exact counterpart in the three most north-western counties of Washington Territory; the North Sea, in some points, being the homologue of the strait intervening between Vancouver's Island and the main-land. To say the least, these resemblances are striking.

The Gulf Stream in the Atlantic has also its equivalent in the Pacific. Crossing this ocean in a north-easterly direction from the Island of Formosa, in latitude 22 N., is found the Japan current, a portion of which sweeps northward through Behring Strait, and another portion, near the Kivule Islands, trends eastward under the name of the North Pacific Swift Current, which eventually gets turned southward along the coast of North America. It probably imparts to the air surrounding it and to the land it comes in contact with, as much heat as the Gulf Stream does to Western Europe. The influence of this current will be seen further on when we come to consider the vegetation of the coast.

About seventy per cent of the winds which pass over Vancouver's Island come from the south or south-west. Being, as they must, high in temperature, and carrying much moisture absorbed in warmer latitudes, when they reach the mountains south of Vancouver's Island, and ascend their southern slopes, this temperature is lowered, and much of the moisture that can be is wrung from them. A still more remarkable instance is found in the western ghauts of India, where the abrupt character of the mountain-sides and their short distance from the ocean combine to produce the enormous rainfall of twelve to fifteen inches in a single day. Statistics show that the southern part of Vancouver's Island has fifty-one per cent of its days clear. New Westminster, in British Columbia, and but fifteen miles in from the coast, has thirty days' more rain

in the year than Victoria. It (New Westminster) is not so thoroughly protected by mountains on its south, and has more immediately north of it. On Vancouver's Island snow seldom falls more than twelve days in the year, and the thermometer is not often lower than the freezing-point. Flowers make their appearance in March. Canada has an annual range of temperature of 138°; at Esquimault harbor (near Victoria) it is only 48° 5′, showing thus an immense preponderance of equable temperature in favor of the latter over the former. In London, rain falls once in two days; at Esquimault, but once in three. From these facts we conclude that, in general salubrity, the climate of Vancouver's Island ranks high. Further north the contrast between the climate of the Frazer-River valley and that of the coast under the same latitudes is a wonderfully marked one. As an illustration, I may state that in November, 1865, I saw the mercury in latitude 55° N. in the Frazer valley stand at 15° in the morning and at 90° in the heat of the day, making thus the unusual diurnal range of 75°. On starting in February of the same year for Rocher de Boulier, west of the mountains, I found the snow in the Frazer valley, on the average, six feet deep, and gradually increasing until in the places higher up among the mountains it was from eleven to twelve; the thermometer meanwhile standing at or below zero. The peaks, in their more elevated portions, were in great part bare, from the snow having been driven by the wind into the valleys or more sheltered rocks. Yet after crossing the mountains and reaching their western, or oceanic, side, in two days' time I had reached a place where the snow was hardly over six inches deep, and the air was as bland as that of March or April with us. These points were under nearly or quite the same latitude. As might be supposed, fearful storms of wind come sweeping through these mountain-gorges down to the lakes. Navigation is hence always more or less dangerous on that account. At Bulkeley House or Lake Tatleh (the extreme

northern lake of the Frazer River), the mercury often rises to over 90° in summer, and for days at a time I have known it range from 30° to 50° below zero in winter. Within a few days of this very time they were having a rain-storm at Fort St. Michael's on the shore of Norton Sound, several degrees further north.

The valley of the Frazer has some five lakes, which serve, however, more to diversify its landscape than they probably ever will to add to its commercial importance; the larger ones being in regions where cultivation of the soil offers but little prospect of profit.

What are the mineral resources of the North-west? Silver and gold are reported from Vancouver's Island; though not, I believe, in large quantity. In British Columbia valuable gold-diggings have been opened. The companies alone shipped 5,140,819 dollars between the years 1858 and 1861 to San Francisco. This is exclusive of that carried off in private hands. The largest nugget taken during that time weighed seventeen ounces, and came from the Caribou region. The quality of the gold is good. Peacock copper ore has been taken from the river in Queen Charlotte's Island. It yielded from twenty to sixty-eight per cent of copper. Along the main-land, and on Vancouver's Island, coal has been discovered in large quantity. That from Nanaimo, on Vancouver's Island, yields sixty-eight per cent of carbon against eighty-four per cent of the best Welsh coal. It is of fair quality, and answers well for marine purposes. The fact of its having about two per cent of sulphur is unfortunate. In view, however, of the remoteness of other sources of supply, the chances are that this coal will soon drive competition from the market there. There is no question as to the existence of coal, and that of good quality, in Alaska. In how large quantity it may be found remains unsettled. It is not unlikely that it will be discovered in accessible localities in paying quantities. Many facts lead to the supposition that most of the enterprise devoted to coal-

mining will first concentrate itself about the more southern mines, before going to those of Alaska. Petroleum, white marble, native copper, and sulphur are reported by Mr. Dall in his work on Alaska.

The vegetation of this region has long been one of its most remarkable features. Trees averaging from 150 to 200 feet in height, and with a diameter ranging from ten to thirteen feet, are quite common. To avoid any seeming overestimate of the timber of the region, I will content myself with some brief abstracts from my botanical report, published by the Smithsonian Institution in 1867, and from them a just conclusion may be formed as to the real commercial value of the timber.

Abies Douglasii, Lindl. (Douglas spruce), from 225 to 250 feet high; diameter often twelve to thirteen feet. Makes good spars, and has a fine, clear grain. The tall flag-staff, in the royal gardens at Kew, is made from a single trunk of this tree. It, of all the trees of the coast, stands, perhaps, first in size and commercial importance.

Abies Menziesii (Menzies' spruce) is somewhat smaller, though still a giant.

Abies Mertensiana (Mertens's spruce) is 125 to 200 feet high, with a fine straight trunk, which frequently grows seventy feet before giving off a single limb. It grows as far north as Norfolk Sound, in latitude 57° N.

Abies Canadensis (the hemlock of our forests) is also reported as far north as latitude 57°. There is, I believe, some doubt as to the specific identity of this tree.

Pinus contorta (twisted pine) is found, throughout the valley of the Frazer, on high grounds. It is from twenty-five to fifty feet high, and about a foot in diameter. It forms extensive forests. In the spring months the Indians strip off the outer bark, and then scrape away the newly-formed cambium layer, which is either eaten fresh, or dried into compact masses for winter use.

Thuja gigantea (giant cedar) grows as high as 170 feet, and has a diameter of ten feet. It extends, I think, about

to latitude 51° N. The timber is light, easily worked, and durable, except when exposed to the sun it is liable to split. I have seen the Indians split boards of it, twenty feet in length. They also use the single trunks of this tree, from which to "dig out" the celebrated northern canoes, which are the most perfect models of boat-beauty afloat. The wood, they also make into boxes, dishes, and canoe-paddles, some of which are of exquisite finish. From the inner bark, mats, hats, and baskets, and ropes of great durability, are made.

Acer macrophyllum (large-leaved maple) is found, in most of the interior valleys, as far north as latitude 55°. It is, to a certain extent, a substitute there for the hickory of our coast, and is a favorite fuel of the Indians inhabiting the valley of the Skena during their long winter nights. The Atnahs weave mats and baskets from the inner bark of this tree which will hold water.

Cottonwood trees appear to be ubiquitous over the entire north-west, and are largely used by the Indians of the interior in making their canoes, and for fuel. I have never anywhere seen such beautiful forests as those of the Lower Skena, where conifers, maples, and cottonwood trees were mingled into the densest of groves. On the less elevated prairie-lands, as far north as the Stukine River, various species of grasses, of great value as forage plants, grow in wonderful profusion, and are mixed, in about equal proportions, with the wild-pea vine.

Even at Fort St. James (latitude 54° 41′), horses thrive well during the entire winter on the forage they find under the snow, and need absolutely no care. The swamps are thickly set with sedges, which are, however, of no great value to stock, except in extremity. The high grounds afford, in abundance, the highly-prized "bunch-grass," so famed for its nutritive qualities. Mules and horses will thrive on it alone (even when it is dead and dried), and undergo, at the same time, great hardships.

From the mouth of the Frazer to its extreme head-waters, and along its tributary streams, are immense stretches of as fertile land as can be found on this continent, and before the end of this century they will support an active civilization. The same may be said of portions, at least, of the Skena and Nasse valleys. Fine crops of wheat, rye, oats, barley, potatoes, turnips, are grown at Fort Alexander, in latitude 53° N.; on the southern prolongation of Alaska the timber is of immense value. The islands of the Sitkan archipelago are densely covered with cone-bearing trees, and have a wonderfully diversified flora (for the latitude), the extreme humidity, combined with high temperature and deep shade, leading to an unusually disproportionate development in the specific forms of the ferns. The snow has hardly melted before the ground is covered with a mass of growing plants, which, under the long-continued sunshine of a sub-arctic day, push into flowers and fruit with amazing rapidity. Even on the banks of the Yukon River, trees are reported with a diameter of eighteen inches or two feet, and during the winter of 1865 and 1866 Mr. Bannister saw fifteen hundred feet of boards sawed at Fort St. Michael's, almost as far north as Behring Strait. On the western side of the continent the forests reach almost seven degrees nearer the north pole than on the eastern. I have enumerated within the limits of Alaska 732 species of plants, of which 560 are flowering and 172 are flowerless. The area of Alaska, as computed by the United States Coast Survey, is 570,000 square miles, including the islands. Chester county of the State of Pennsylvania, with but 738 square miles, has just about double that number of indigenous flowering plants. This, however, only implies for Alaska a poverty of specific forms, and not a sparse vegetation, for we find the country has, during its short summer, a luxuriant growth of vegetation, only not of so diversified a character as that of more favored regions.

In certain portions of North-western America animal life is abundant. During the spring and fall months the rivers and lakes absolutely swarm with water-fowl. Grouse are abundant over almost the entire country. Beavers, martens, minks, otters, and bears go to swell the list. The caribou is quite abundant among the Peak Mountains, and on it most of the Indian tribes depend for much of their winter supply of food. During the summer months the rivers are literally alive with salmon. No words can convey any adequate idea of the numbers in which these magnificent fish ascend the streams. The Indians, after having speared or taken them by wholesale in wicker-work baskets, dry them for winter use. The taste is then not unlike that of the hardest and driest birch-bark. A glance at the list of fishes enumerated in Mr. Dall's book on Alaska shows for that region no mean array of piscatorial life. Among the marine fishes are the cod, small-cod, true-cod, halibut, flounder, ulikon, and herring. In fresh-waters are found salmon-trout, salmon, white-fish, pike, sucker, blackfish, and a multitude of others. Of these species there seems to be no scarcity of individuals.

Indians—what shall I say of them? It has often been remarked that those who have spent most time among the Indians have given the most discouraging accounts of them. The inference has hence been drawn that the observers were all prejudiced against the red races. This view, I admit, is certainly the one best adapted to the so-called humanitarian notions; but whether it is so logical as to suppose that these uniform disparaging statements might be due to some mental defect, a moral obliquity on the part of the Indians themselves, I leave others to decide. It might, however, be well to remember that ignorance in the woods is not more apt to engraft virtues on itself than it is in civilization, and that æsthetics are extremely unlikely to be engendered by savage surroundings. Some of the most accomplished rogues I have ever

met were some unsophisticated members of tribes that had never seen half a score of white men. To their inherited original sin I think the best of them have some actual transgressions of their own to add. A gentleman, not less known as a philosopher than as a botanist, remarks that "ignorance is not *per se* a crime. Its heinousness depends on the use that is made of it." I am inclined to accept this concise statement of intellectual and moral relations; but still, even with this light, the Indian is not made any more immaculate, for I could readily show what shockingly bad use they are accustomed to make of their ignorance.

I have no desire to disparage or to underrate our American races; but, as much of our sympathy for them is the outgrowth of some overdrawn estimates of their character, it is only just that they should be fairly judged before we are influenced in conduct by these estimates. That there have been some Indians of real intellectual power, I will not be unjust enough to deny. I think, however, a fair analysis of the list of worthies will shorten it greatly. Some have been pre-eminent simply by contrast with the herd of educated savages around them; others from overwhelming uncurbed passion and mere physical courage, qualities a pugilist may possess. We have too often regarded their orators eloquent, when their expressions were the natural and uncontrolled utterance of some fierce emotion. They felt, with all their rough natures, all they said, whether that was good or bad; but there is an eloquence depending on high culture which is chaste, pathetic, and convincing, to which a happy selection of similes, derived from an abounding knowledge, is subservient. Of this the Indian knows nothing. His eloquence is not peculiar to himself, but is simply the product of a certain stage of barbarism. It has, truly, the merit of being natural, and borrowed from the forms and forces of nature about him; but it is not so from choice. His ignorance has imposed this upon him. When he tells you his

fathers were as numerous as the flowers on the prairies, he does so, not because he appreciates the æsthetic element involved in the comparison, but because each flower to him counts one. He cannot appreciate the abstraction we call thousands, which is equally eloquent and vastly more definite. Or he may tell you of the roar of the cataract, or of the lightning playing from peak to peak; but does he deliberately choose these similes? Rather is it not because, from the poverty of his language, he is compelled to call in the lawless forces of nature to aid him in the expression of his ideas? He never attains to any conception of his own mental operations. His views are all retrospective, never introspective. Even his spiritual ideas are so that it is equivalent to destroying a pleasant illusion to say just what they are. All assertions to the contrary, notwithstanding, I am convinced there are *some tribes* who entertain no ideas at all of a postmortal state or of any overruling divinity.

Practically we are all believers in manifest destiny, and it is with a poor affectation of modesty that we doubt whether this entire continent will ever belong, or ought to belong, to Anglo-Saxon races.

The recital of our dealings with the Indians does, I confess, make a black page in history against us, if we admit that territory of necessity belongs to those who first occupy it; but when we think of the millions from overcrowded Europe and Asia who are now seeking a home upon our shores, where they and their children may develop to the fullest extent all their mental and physical powers, the products of which are to add to the wealth, health, and happiness of all mankind, does it not seem as though the greatest good to the greatest number, which is the perfection of political science, demands that to mere *possession of a domain* we shall add, to constitute a perfect title, *improvement of that domain?* In this latter clause our red races have signally failed.

I am told they are here first in the providence of God; to which I reply by asking are they, then, here more under Providence than we, or are the instincts of barbarism, which demand so large a territory for their gratification, more heaven-implanted than the instincts of civilization which demand the same territory on which to reap greater public benefactions? I use numbers guardedly when I ask whether *three hundred Indians, who are ignorant and destructive in all their propensities*, have any right, divine or legal, to shut off from the occupation of a fertile country *three millions of intelligent, producing white men*, who would develop its resources, and send the proceeds into commercial circulation? Shall we lay an embargo on that civilization, before the heavy tread of whose great ideas and magnificent plans our rivers and prairies become tributary to the well-being of all mankind? Shall we cease belting the continent with railways, or stop extracting the ribs of silver from the mountain-sides of Nevada, lest we limit the range of the buffalo, or trench on the traditional rights of a race that is content to live for itself alone?

There do sometimes arise emergencies when all those minor aggregations of individuals which we designate as races are lost in the one greater, all-comprehending bond of a common humanity; where the more powerful interest not only may, but must, say to the weaker: "You must conform to our modes of life, to our habits of thought; you must cease to stand in the way of the universal progress with which we are identified; nay, more, you must aid us. We leave you no alternative. We no longer regard you as aliens of another tribe, with whom we will have no friendly intercourse, but we force you into our brotherhood; acknowledging your manhood, we demand your active coöperation in our beneficent designs. If you refuse to join this broadest of all alliances, you must pay a penalty, the greater because of the high privileges you fail to accept. Great as is the responsibility incurred in

exterminating you, and your opposition to our mission, we assume even that, if it must be, rather than fail to do our share in the age's work." This emergency, I think, now faces us, and I also think the spirit of our rulers is to offer first, fairly, the olive-branch in good faith; and if this last, best measure fail, then to relentlessly sweep out every opposing element of barbarism. The world can no longer afford to the Indian an independent existence, with the privilege of roaming over tens of thousands of square miles, at the cost which that entails to our better civilization. Mankind at large is no more bound to tolerate a race of vagrants than one nation is to tolerate an individual vagrant. The principle involved in both cases is the same. Within memory of most of those now living, our government compelled the Japanese to throw open their ports, and to break the seclusion they had maintained for centuries, and Christendom approved the act. Do I strain the point when I say the law involved in both cases is the same? However inhuman it may seem, I scout the idea that this broad domain belongs any more to barbarism than to civilization.

There is, however, one more aspect in which we may view our Indian relations. Whilst we are responsible in part for their disappearance, and criminal in our neglect of what does legitimately belong to them, we may also well remember that, over and above all this, a Higher Power has willed their melting away. It is purely a work of supererogation to place any sin at our doors which does not belong there. Broad as are our national shoulders, they already groan beneath the load of iniquity they cannot shift elsewhere. In one word, I think mere human form and a minimum of brain power have accomplished their work on this continent, whatever that work was; and that the Creator is now allowing the red races to disappear, just as He allowed the mammoth and mastodon to go before them. Their vanishing looks like a continuation of the eternal scheme in which lower beings

have always made way for the higher. The very breath of an approaching though still distant civilization seems to destroy them as certainly as the Assyrian host melted before the destroying angel of the Lord.

Father Baegert, a Roman Catholic missionary, who lived seventeen years on the peninsula of Lower California during the latter half of the last century, writes: "It is certain that many of their women are barren, and that a great number of them bear not more than one child. Only a few, out of one or two hundred, bring forth eight or ten times, and if such is really the case, it happens very seldom that one or two of the children arrive at a mature age. I baptized, in succession, seven children of a young woman, yet I had to bury them all before one of them had reached its third year. The unmarried people of both sexes and the children generally make a smaller group than the married and widowed."

Ross and Mackenzie reiterate the same ideas. Now, these statements are distinct and unequivocal, and what gives them a peculiar value is, they come from men who have spent years among tribes remote from any possible injurious contact with whites. They were the representatives of interests striving to protect, from motives of religion or policy, the aborigines from any of the destructive influences which have so often followed civilization.

History, more or less reliable, tells us what fearful plagues decimated the Indians at the very spot at which our pilgrim ancestors afterward landed; a fact, by the way, which the humility of the Puritan band did not prevent them from interpreting into a special interposition of Providence in their behalf. I have travelled down the valley of the Skena and seen whole villages falling into ruin, fisheries deserted, and extensive camping-grounds overgrown with weeds and underbrush, and no corresponding later ones. The most numerous memorials of large tribes were the rude boards they had placed to mark the burial-places of their friends. In times of sadness,

those who still linger on their traditional hunting grounds will tell you of their waning forces. In the summer of 1866 I saw more than half of one large village die from a disease simulating Asiatic cholera. I know of another tribe which within ten years has been reduced from eight hundred men to less than half that number. Infanticide is common among certain tribes, especially of the female children. All of these facts come to us from tribes to whom civilization has never come. Does it not seem as if their mission were accomplished, and that they were doomed to go, irrespective of us? It still does remain for us to cast about them every protection which is not inconsistent with the general good of humanity.

Resources of the North-west.

I am probably not far from the truth in asserting that, in British Columbia, there are 50,000 square miles of territory capable of supporting a large agricultural community. Over a large portion of this region wheat, rye, oats, barley, with potatoes, turnips, onions, and cabbages, may be grown with reasonable certainty that they will mature. Fruits will undoubtedly do well. Some of the largest and best-flavored turnips and potatoes I have ever eaten were raised on land that, for sixty years, had been used by the Hudson's Bay Fur Company's men, with hardly an idea as to the value of rotation of crops or the use of fertilizers. We can all remember when it was said that the State of California could never be self-supporting. Yet to-day it is, of all others, the one garden-spot of our nation. Its incomparable climate does much for it; but much of the soil in British Columbia is just as fertile, and in some small portions of its surface, where the drought has hitherto been dreaded, the Chinese have shown how much may be done by civilization. The luxuriant crops of grass show what the soil is capable of. I need not again allude to its timber. In the rougher portions of the country grazing may be profitably fol-

lowed. As a future manufacturing centre, I anticipate much from certain portions of this region. The presence of coal of good quality and in sufficient quantity, and the great water-power of the region, can hardly fail to be made subservient to large manufacturing interests.

The future must, of necessity, make much of its marine and fresh-water fisheries. Probably no fish-market in the world is better stocked than that of Victoria, on Vancouver's Island. The salmon of the Columbia have a reputation which has already reached this coast; and I should probably be stating the truth were I to assert that those from the Frazer, Nasse, Skena, and Skeekine rivers are as much superior to those from the Columbia as those of the latter are to our eastern salmon. At a certain season of the year a small fish, known as the olihan, is taken in incredible numbers in the Skeekine River. They are so absolutely saturated with oil, that when dried and lighted they may be used as candles. The natives express the oil in considerable quantities, which, after being kept until it has reached a ripe old age, with sufficient rancidity, is used by them as a special delicacy on state occasions. This oil has been seriously proposed as a substitute in medicine for cod-liver oil. I can aver that it is equally as loathsome. I think it not improbable that, at no distant day, the fisheries off the Alaskan coast will yet become as important to the west as those of Newfoundland are to the east.

Few of us here have any idea of the real value of the fur trade, or how much it has proved a source of wealth to those engaged in it. The endless bickerings, the open aggressions and the actual warlike encounters of the rough, lawless, but generous-hearted servants of the old North-west Fur Company and the Hudson's Bay Fur Company have passed into history, and may serve to indicate what estimate the traders themselves placed upon their vocation. I think I do not exceed the truth when I assert that, for an outlay of $50,000 a year, the Hudson's Bay

Company reaps an income of at least half a million dollars a year (rating the furs at London prices) from the New-Caledonian district. Yet this is, by no means, the best-paying district under control of this company. Quoting from Dall's Alaska, I find that, during seventy-six years, Alaska has yielded 3,833,402 skins of fur-seal, which, at an average price per skin during that time, would be $11,500,206. Besides this, we have of sea-otter skins, 262,546; beaver skins, 390,972; black and silver fox, 66,081; marten skins, 46,911. These are simply the more important furs, and, after making the proper allowance for the thieving propensities of the Russian officials, show conclusively that the fur-trade alone is a source of immense revenue.

Now, these statements as to the resources of the Northwest are founded on what has been developed by the comparatively small demand of a distant market, and a sparse population near at hand. Under the stimulus of a completed Northern Pacific Railroad, we may fairly expect an immense development of the resources, and a corresponding increase of demand, or *vice versa*. The whole future of British Columbia, with all its prospective resources, lies in the completion of that grand enterprise. Who may tell what population the broad prairies and fertile valleys of that region will be supporting half a century hence, or what will be the products of its looms, its mills, and its mines, before even this generation shall have passed away? Less attractive regions, under a less onerous system of taxation and a greater encouragement to individual enterprise, are now the homes of millions. Remove the burden of taxes from British Columbia and Vancouver's Island, support the hands of their citizens, and it will give a new life to a new north-west. Compare the thrift south of the Strait of Fuca with the stagnation north of it, and remember the general fertility of resources in both, and the conclusion is unavoidable that a difference in government must have something to do with

the diverse condition we see in British Columbia and in Washington Territory. As for Alaska (with its similarity, so striking in many respects, to the Scandinavian peninsula), may we not fairly hope its future will, in good degree, be comparable to the present of Sweden and Norway? Its resources are, for the most part, still lying fallow. Time, and time alone, can decide how much it is to be worth to us from a financial standpoint. Enough, I think, is known about the region to make us suspend, for the present, at least, any adverse judgment.

There is, however, still one more aspect in which we may view our occupancy of that territory. In taking a retrospective view of the doings of our race, we find its mission has been to civilize. It has ever been a catalytic element, whose presence has produced a fermentation among the other national elements. It has broken up the unstable compounds and replaced them by more staple ones, which, from fixedness of character, were better fitted to play some important part in the world's history. More than three thousand years ago our Aryan fathers left their early home, north of the region we now know as India, and began their beneficent migration. The race developed in India a civilization we are only now learning fully to appreciate. It peopled Greece, where its language flooded out in blind Homer's recitals, and it gave Thermopylæ to the world. It overflowed Italy, where its great, ever-varying, ever-fitting yet ever-constant character produced the poetry of Horace and Virgil, the histories of Tacitus and Livy, the Theodosian and Justinian codes. "There was a time," says Müller, "when the ancestors of the Celts, the Germans, the Slavonians, the Greeks, the Italians, the Persians, and the Hindoos were living together beneath the same roof." Our dearest terms, "God, father, mother, son, daughter, heart, tears, and home, can be traced to that starting-point." Saturated (if I may be allowed the expression) with the constant instinct of conquest, to be followed by civilization, it has

always adapted itself to the ends it was unconsciously striving after. It found a way open, or it made one, and from every bloody field left in the track of its wanderings have sprung up the compensating fruits of an improved morality, and a greater mental activity than existed before. Its every footprint on a soil has been a blessing; and it is remarkable that the one common feature, the best and most fruitful feature, in all the races that have an infusion of its blood, is just the one in which they most resemble the parent stock,—a constant striving after better things, which is so utterly unlike the self-satisfied condition of other nations. Hawthorne says, with truth, "The world owes all its onward impulses to men ill at ease. The happy man invariably confines himself within the ancient limits."

Having received so much, we are now called upon to shoulder the burden of bringing Alaska under the domain of law, civilization, and increased usefulness to the world. It is manifest destiny. It is the working out of our inherited instructive traits. It is duty, and, perhaps, the grand finality of our national existence, as it may prove the last and most difficult task left for us to accomplish.

VI.

THE PALEOGEOGRAPHY OF THE NORTH-AMERICAN CONTINENT.

By T. Sterry Hunt, LL. D., F. R. S.

READ NOVEMBER 12TH, 1872.

The fitness of bringing before the American Geographical Society a theme which seems to belong rather to the province of the geologist will be admitted, if we consider that geography is in fact but a branch of that comprehensive study to which we may give the name of geology, and which, in its wider sense, includes the whole natural history of our earth from the earliest times to our own. To the geographer belongs the study of the present condition of the globe, its oceans and lands, its mountains and rivers, its soils and climates, and its plants and animals. Past and present astronomical and meteorological agencies, and the action of internal forces, have combined to produce the results which are the object of the geographer's study. The structure and arrangement of the materials of the earth's crust, its architecture, as it were, give rise to geognosy, while the theory of the origin and development of the globe constitutes geogeny. *Geogeny*, *geognosy*, and *geography* are thus three great divisions of the earth-science, or *geology*.

To the geological student the world of modern geographers is not the only one. In the distribution, arrangement, and varied nature of the rocky strata of the earth, and in the extinct races of plants and animals which they

envelop, he finds authentic evidence that each past geological period has had its own geographical history. Parts of the present ocean's bed cover the ruins of continents submerged, and our own continental areas included at times fresh-water lakes, seas with verdant islands, salt-water basins in the midst of a dry and desert land, or coastal regions swept by great marine currents, often charged with ice; and these varying conditions were in turn exchanged for "the stillness of the central sea." The record of animal and vegetable existence is traced backwards through all this varying succession until the dawn of plant-life is dimly seen in the oldest known of our rocky strata, those of the eozoic age. The student of organic fossils constructs from their history the sciences of *paleophytology* and *paleozoölogy*; and we may also, from the records of the attendant physical changes, construct what may be appropriately named *paleogeography*, or, the geographical history of these ancient geological periods.

This study is one which has often engaged the attention of geologists, and maps have been made to show the distribution of land and water on the European and North-American continents in various geological periods, based upon the distribution of the sedimentary rocks. Other principles may, however, serve to guide us to a further knowledge of these periods, of the rain-fall and evaporation over certain areas, of ocean-currents, and of the distribution of organic forms; principles which have not yet received all that attention which is their due, and which may be, to some extent, illustrated on the present occasion in a sketch of certain phases in the history of the North-American continent.

The period in which were deposited the various crystalline rocks of the Laurentides, the Adirondacks, and the Appalachians, offers in its greatly disturbed and contorted strata but very obscure data for its geological history. That the deposition of mechanical sediments went

on under conditions not altogether like those of later periods, but still so much resembling them as to admit of the existence of both vegetable and animal life, seems clear, and justifies for them the name of eozoic. That the long eozoic age was marked by several breaks is also evident from the fact that in these crystalline rocks have been included three or four distinct and unconformable series, if not many more, all of which are found developed alike in the Laurentian and the Appalachian regions. Of these series, however, over great areas, only the oldest and most resisting, the Laurentian, remains.

What Prof. Dana has called the azoic, but which may rather be called the eozoic, nucleus of the North-American continent includes portions of all of these; but, as defined by him, represents but a small portion of the land which in this part of the globe appeared above the ocean at the beginning of the paleozoic age; since besides the crystalline rocks of the Laurentides and the Adirondacks must be included the similar ones of the Appalachians, which now stretch from the Gulf of St. Lawrence nearly to that of Mexico, and in their present extent represent but a small portion of a great continent of whose former outlines we can form but an imperfect notion. Connected to the north-eastward with the Laurentide region, it must have extended far into the Atlantic, and formed the eastern limit of a great paleozoic basin, the western boundary of which was the Rocky Mountains. Within the basin were deposited the sedimentary formations of the New York system, including the Cambrian, Silurian, Devonian, and carboniferous rocks. The region in the vicinity of the Adirondacks, and to the west of them, was at the commencement of the paleozoic period a great plateau, which, at one time, was but partly submerged, and presented wide tidal flats, the sands of which are marked by ancient ripple-marks, wind-marks, and tracks of the animals belonging to the time of the Potsdam sandstone.

About this period, however, great thicknesses of sediments, differing widely in volume and in mineral character from those of the plateau, and in part made up of the ruins of the crystalline rocks of the eastern land, accumulated along the eastern shores of the basin. Meanwhile the plateau was, during a part of the time, above the level of the sea, and in parts cut off from the great oceanic circulation, and exposed to the influence of a very dry climate. The conditions which exist at the present day in the interior of our own and other continents, and give rise to deserts and salt lakes, were present at that early period over the great continental plateau already indicated. These conditions are dependent on mountain-barriers, causing the precipitation of a great part of their moisture from the currents of air which traverse them, so that the regions beyond, with a great rate of evaporation, have a scanty rain-fall, from which results the drying-up of saline waters and the generation of deposits of gypsum and rock-salt; in similar conditions, as I have endeavored to show, the magnesian limestones, which are the general associates of these, can alone be formed. The history of this great paleozoic basin affords ample evidence that between the limits of the Appalachians and the Mississippi considerable areas occupied by evaporating sea-basins existed at several periods in the paleozoic age; the first known example appearing in the subordinate Ottawa basin at the time of the deposition of the so-called calciferous sand-rock of the New York series, which is really a dolomite, inclosing in some parts gypsum, and impregnated with strong brines, which, from their great density, can be nothing else than ancient bitterns. To this local formation (followed by the Chazy) succeeded the wide-spread Trenton limestone, which, by its chemical characters, not less than its fauna, shows an open sea, and points to a movement of subsidence which disturbed the former levels, and made a partial break in the paleozoic series. This is

shown alike in its partial discordance with the underlying formations, the wide invasion by the Trenton sea of the adjacent land, and the noticeable break in the succession of organic life. The gradual filling-up of this sea by the influx of mechanical sediments, the ruins of older rocks, apparently from the north and east, and the accumulation from this source of the Utica, Hudson River, and Oneida formations, mark the close of this order of things, and serve to divide the rocks of the second fauna, or Upper Cambrian (Lower Silurian of Murchison), from the succeeding period, or Silurian proper (Upper Silurian of Murchison).

Following this disturbance there reappeared over large areas of the continental plateau conditions similar to those of the calciferous time, in which the marine fauna of the Clinton and Niagara formations became overlaid by the dolomites of the Salina group, which, with their interstratified gypsum and rock-salt, occurring over more than one area at this horizon, show that evaporation was carried to such an extent as to produce in Central New York and in Western Ontario great Dead Seas, whose bitter and saline waters were destitute of animal life. Over the deposits of this period, and beyond them, over the Upper Cambrian rocks, which formed the eastern shore of these inland Silurian seas, the waters of the ocean again flowed, and we find in the limestones of the Lower and Upper Helderberg divisions reproduced once more the conditions of the Trenton period. The movement which permitted this must have depressed considerably the mountains of the eastern shore, and for the first time in the paleozoic period permitted the ocean's waters to invade the Appalachian hill-country, in which, while no evidences of earlier paleozoic deposits are met with, strata with organic remains belonging to this period (the close of the Silurian and the commencement of the Erian or Devonian) are found. These deposits, often themselves much disturbed, are met with among the valleys of

Maine, New Hampshire, and Quebec, resting unconformably upon the older crystalline rocks, while they occupy similar positions upon the Upper Cambrian rocks of the Hudson and St. Lawrence valleys.

This submergence, which spread over wide areas the marine deposits of the Helderberg limestones, was, like the corresponding event of the Trenton period, followed by a silting-up of the sea, and the deposition of the argillaceous beds of the Hamilton formation then took place, followed by the great mass of sandstones and shales of the Erie division, the so-called Devonian or the Erian series of Dawson. These sediments, which came from the north-east, and thicken rapidly in that direction, marked the commencement of that great influx of material which continued into the carboniferous time and built up on a subsiding ocean-floor the great volume of later paleozoic sediments which is seen alike in Nova Scotia, and in New York and Pennsylvania. Made up of the ruins of older rocks, they show the results of the wasting and wearing-down of a great area of solid land of which the eozoic regions of New England and the British maritime provinces are the vestiges. That the shores of the sea in the corniferous period already bore a vegetable growth is shown by the remains of ferns found by Newberry in the marine limestones of that date in Ohio. A little later, in the time of the Hamilton formation in New York, there was an abundant growth of tree-ferns on its eastern shore, while further to the eastward, in Gaspé, the struggle between sea and land is shown in the presence of terrestrial vegetation in marine limestones probably of the Oriskany age.

As might be expected from the source of the land-making sediments, the whole of the Erian series in Gaspé is made up of them, to the exclusion of limestones, while to the westward the limestones of the lower part of that series, and later those of the carboniferous, are overlaid at both periods by these sediments, which, gradually

encroaching upon the sea, made a soil for the vegetation of the coal. That even at this period the meteorological conditions producing great dryness recurred at times over portions of this region, is shown by the gypsum and salt deposits of the carboniferous age, which are found not only in Pennsylvania and Michigan, but far eastward in Nova Scotia and New Brunswick. It is not necessary here to recall the story of the carboniferous period, with its great development of terrestrial vegetation over low marshy plains, in which appear, for the first time, the remains of terrestrial mammals and air-breathing mollusks.

The close of the paleozoic age in our eastern basin was succeeded by movements which raised above the sea the vast accumulations of sediments whose history we have sketched, and exposed them, contorted and dislocated, to that process of erosion which, operating down to our own time, has given its present relief to the continental area now occupying the place of the former paleozoic basin. Unlike the Old World, this eastern portion of the New has little to show for the long mesozoic period, during which so much of Western Europe was submerged. Along the Appalachian line, however, were formed in this age the remarkable sandstone deposits, of which those of the Connecticut and the Delaware are examples. These accumulations, many thousand feet in thickness, and made up in great part of the ruins of adjacent rocks, were formed in the lakes or estuaries, and exhibit in their character evidences of rapid deposition in subsiding basins, a process which was accompanied by great volcanic activity in and around these areas. Somewhat later the deposits of cretaceous and tertiary time were laid down beneath the waters of an ocean which stretched along the eastern, southern and western shores of the now elevated paleozoic area. Sediments of these periods, moreover, occur in Greenland, Spitzbergen, and elsewhere within the arctic circle, where strata, including coal and the remains of an abundant terrestrial flora, indicate as late

as the middle tertiary a climate in these far northern regions as mild as that now prevailing in Pennsylvania and Ohio, and a vegetation not dissimilar. Did time permit, we might trace, with Dr. Gray, the probable southward migration of this ancient northern flora into our Appalachian region. That similar climatic conditions had existed in the arctic zone at a much earlier time, is apparent from the remains of an abundant vegetation in the carboniferous period; nor is it certain that the present rigorous climate was ever known there until the miocene age was succeeded by that change which ushered in the present order of things, and, from the great part that ice played therein, is called the glacial period. To explain this changed condition of the arctic climate three classes of agencies have been invoked; viz., astronomical, chemico-physical, and geographical. While the former are supposed to have produced variations in the amount of heat received from the sun, I have shown that the chemical changes which have been effected in the atmosphere have served to render it less and less fitted to retain terrestrial and solar heat, and to protect the earth's surface from cooling by radiation, until a point was reached where we may suppose that changes in the areas of sea and land, and consequently in the distribution of warm equatorial currents, would suffice to produce over extreme northern and southern regions a temperature like that which in Greenland succeeded, after a considerable but unknown interval, to the mild climate of the miocene time. While these latter are doubtless true causes, adequate, either conjointly or separately, to produce a great refrigeration, it is by no means improbable that astronomical agencies may have coöperated. Even with the atmospheric conditions of earlier times, we may conceive glaciers to have existed in elevated regions and at high latitudes, and probable evidences of ice-action have been pointed out in the strata of paleozoic times.

The phenomena which in eastern North America and

elsewhere are referred to the glacial period are the erosion of valleys and lake-basins; the rounding, grooving, and polishing of rock-surfaces; the accumulation of great masses of unstratified clay, sand, and pebbles; the so-called boulder-drift, together with the formation of ridges, moraines, etc. To these succeeded the stratified marine clays and sands of what Dana has called the Champlain epoch, containing a fauna identical with that of our present northern seas. That these post-pliocene deposits show a temporary depression of the previously-uplifted continent far below its present level, and that ice in some form played an important part in the phenomena of the period, or of one immediately preceding, are points upon which all are agreed; but beyond this, wide divergences of opinion are met with, which concern primarily the time at which this submergence took place; and, secondarily, the mode in which the ice-action was exerted to produce the striation and the accumulations of unstratified material. On the one hand, it is asserted by a large school that these were produced when the region was at its present altitude, or even much higher above the level of the sea, and was exposed to a wide-spread glacier-action. But among this school opinion is again divided. Thus, Agassiz maintains the existence of one immense continental glacier or ice-cap extending over the arctic and a great part of the temperate zone, moving downward from the polar region, and of such immense height as to surround and overflow the summits of our highest hills, which he supposes may have required a vertical thickness of two or three miles of solid ice. This great glacier, having its under side filled with fragments of rock, is conceived to have acted like a rasp, cutting, grinding, and shaping the underlying rocky surface; and, when the period of the gradual melting came, to have left behind it the glacial drift which we now discover. Dana, on the other hand, while maintaining that these phenomena are due to terrestrial glacial action, regards the motion of a central

or common glacial source, or, in other words, a universal glacier, as unfounded, but supposes, nevertheless, the existence of distinct glaciers of enormous magnitude. Such a one, according to him, had its origin along the watershed between the St. Lawrence and Hudson's Bay; but, recognizing the necessity of an elevated source to give motion to the glacier, he supposes that this region, which is not more than 1,500 feet above the sea, was then raised many thousand feet above its present level, forming a mountain-plateau from which an immense glacier spread south-eastward to the ocean, filling the St. Lawrence valley, and covering, with its icy mantle, both the Green Mountains and the White Mountains, precisely like the continental ice-cap of Agassiz. The movement of such a glacier, however it may serve to explain the south-eastward striation of the Ottawa valley and of New England, leaves unaccounted for the not less distinct evidences of glacial action in a transverse direction, which are seen from Labrador up the St. Lawrence valley, as far as Lake Erie. These evidences consist alike in the striation everywhere visible, and in the forms of isolated hills of eruptive rocks, which, rising from the champaign country in the vicinity of Montreal, have bold and rounded fronts on their north-east sides, while their ruins form a talus to the south-west, and have even been transported long distances in this direction. All of these facts combine to show a long-continued eroding action from the north-east. Prof. Dana would explain this by a supposed south-westward flow of the lower part of the great glacier in this direction, along the St. Lawrence valley, while its upper portion was moving in a transverse course, across the mountain-ranges of the Appalachians, towards the sea. But this, even if we admit its adequacy to explain the phenomena of the St. Lawrence valley, leaves unaccounted for the extension of the same south-western striation around the basins of the great lakes, as far as Michigan and Superior, to explain which would

require the creation of another great glacier in the northern regions.

In both of the above theories of glacial action, a great depression of the surface is supposed to have succeeded the glacial period, effacing, in the one case, the great mountain-plateau to the northward, and submerging the glaciated region so as to permit the deposition above its surface of the stratified clays and sands which so often overlie the boulder-drift, from the rearrangement of which they appear to have been, in part, derived.

Besides these theories, which seek to explain the various glacial phenomena by the action of ice upon solid land, there is a third view, which, while maintaining the intervention of local glaciers, supposes that by far the greater part of the results which we have described was produced by sea-borne ice, during a period of submergence. This earlier view, which has lately been ably advocated by Dawson, endeavors to explain the phenomena in question by causes now in operation, rather than by supposing a condition of things which it is at once difficult to conceive and to explain, and is thus more in harmony with the principles of modern geological science. It maintains that at the beginning of the glacial time, whose record is written in such marked lines over the surface of northeastern America, the region was already under water, and was slowly rising, though with minor oscillations of level, from the ocean, the more western portions first. Along the eastern border of the land, over its still submerged plains, and through its valleys, then flowed the arctic current, as it now does along the coast of Labrador and the shores of Newfoundland, bearing great quantities of floating ice, by the combined action of which, with the current, the rocky strata were eroded, and the valleys and lake-basins excavated. At an early period in this order of things, the great arctic stream, pursuing, in obedience to the force impressed upon it by the earth's rotation, a south-western course, passed over the region of the

lakes, and excavated the basins of Superior, Michigan, Huron, and Erie; while at a later time, diverted further eastward by the emergence of the Laurentides, it would pass along the present St. Lawrence valley, and thence south-westward to that of the Mississippi. To quote, in this connection, the language of Dawson, "The prominent south-western striation and the cutting of the upper lakes demand an outlet to the west for the arctic current. But both during depression and elevation of the land, there must have been a time when this outlet was obstructed, and when the lower levels of New York, New England, and Canada were still under water. Then the valley of the Ottawa, that of the Mohawk, and the low countries between lakes Ontario and Huron, and the valleys of Lake Champlain and the Connecticut, would be straits or arms of the sea, and the current, obstructed in its direct flow, would set principally among these, and act on the rocks in north and south, and north-west and south-west, direction. To this portion of the process I would attribute the north-west and south-west striation."

As the process of elevation proceeded, and the northern current found its passage to the sea by channels further and further east, the conditions became such as to permit the deposition, from seas comparatively undisturbed, of the stratified clays and sands which, in many cases, rest directly on the boulder-clay. Such beds, with marine fossils, are found in the St. Lawrence valley, at heights nearly 500 feet above the sea, and others, though without fossil remains, at much higher levels. Portions of floating ice, however, still dropped, from time to time, the rock-masses with which they were freighted, in the midst of these stratified clays; nor are there wanting evidences, in the Lower St. Lawrence, that a second invasion of icebergs may have given rise to a new accumulation of boulder-drift, after the deposition of the stratified clays, which there overlie, at Trois Pistoles, a still older deposit of the same kind, as noticed by Dawson. Such

a result might readily follow from a small local and temporary depression of level during the general elevation.

That some oscillations of the kind took place during this period may be inferred from certain facts in the history of the great lakes. The basins of these, according to Dr. Newberry, are so connected with each other and with the sea, by channels now filled with drift-deposits, that were these removed and the continent slightly elevated, the waters of the great lakes would be discharged through each other into the ocean, by the valleys of the Hudson and the Mississippi. The lake-basins of Michigan, Huron, St. Clair, and Erie, in fact, occupy a great depression, which was first excavated in the nearly horizontal paleozoic strata, and then filled up with stratified clays, in which the present basins were subsequently fashioned, so that from alternations of level the process of lake-erosion has been repeated over this region.

I have elsewhere pointed out that the base of these clays, beneath the south-western part of Lake Erie, of Lake St. Clair, and in much of the adjoining country, is far below the bottom of these lakes; so that it would seem that these present lake-basins have been excavated from the post-pliocene clays, which, in this region, fill a great ancient basin previously hollowed out of the paleozoic rocks, and including in its area the south-west part of the peninsula of Ontario.

The valleys of the hills and the shores of the islands, which then rose above an icy sea, would be filled with local glaciers, of which the marks still remain, which gave their tribute to the northern current, already charged, as now, with immense icebergs from the polar region, and these in great part submerged and half-stranded masses, urged by wind and tide, would plough and furrow the bottom, there piling up the unstratified heaps of boulder-drift, to which the earth and rocks, borne by the melting

ice, would contribute. It is a point of great significance, insisted upon by Dawson, that this glacial drift throughout the St. Lawrence valley often contains marine shells, and that the included masses of rock are frequently incrusted with barnacles and with polyzoa, showing that these materials must have been gathered not from the surface of a long-emerged continent, but from the bottom of the sea.

I have thus endeavored to set forth briefly the very different views which have been advocated in explanation of the phenomena of the glacial period in the history of our continent. These, according to the views of the land glacialists, were limited to a definite epoch, and operated simultaneously over a vast area, which, according to one hypothesis, was not less than an entire hemisphere. Those, on the other hand, who restrict the action of land-ice to local glaciers, and call in the aid of floating ice and the polar current, maintain that the process of glaciation is one limited rather by place than by time. Ever since the conditions of the earth have been such as to give rise to the formation of polar ice, the shores and the shallow seas, to which the arctic current flowing southward had borne it, must have been subjected to glacial action such as we have endeavored to describe. From the days in which the glaciation of our valleys was effected the process has not ceased, but has been transferred to other regions; and we conceive that the banks of Newfoundland, if now raised above the ocean's level, would present striations and glacial drift, which, but for the presence of remains showing its formation to belong to the historic period, would be indistinguishable from the ancient boulder-clays of the St. Lawrence valley.

The attempt which I have made, to-night, to set before the Geographical Society some phases in the physical geography of a portion of our continent, from paleozoic times downward, might be made more complete by trac-

ing the development and spread of animal and vegetable life over the upraised continent. The migrations of the present flora, especially, present many questions of great interest alike to the botanist and the geologist, but the adequate discussion of this question, even did time permit it, is one beyond my powers.

The view which I have announced above, that *the crystalline rocks of the Appalachians represent but a small portion of a great continent*, of whose form and outlines we can form but an imperfect notion, but which formed *the eastern limit of the great paleozoic basin*, is not a new one. So long ago as 1842, H. D. Rogers concluded that the sediments of the paleozoic age in the Appalachian region must have come from a continent, which, however, he placed to the south-eastward. Hall, in the introduction to the third volume of his Paleontology, has well shown the distribution of our carboniferous and still older paleozoic sediments, and their rapid increase in volume and in coarseness towards the north-east; and in my review of this work, in 1861, these sediments were spoken of as "evidently derived from a wasting continent," Hall, himself, having said, "We may have had a coast-line nearly parallel to and coextensive with the Appalachian chain." I have, in the present lecture, insisted still farther upon this view, and advanced, in favor of an elevated eastern continental area, an argument adduced from the climatic conditions which, as I have long since shown, must, throughout the paleozoic times, have prevailed at intervals in the basin to the westward. It was not until this address had been delivered and written out, as above, that I received the American Journal of Science for December, 1872, in which Prof. Joseph Le Conte announces, in language almost identical with my own, that the eastern part of the basin received its sediments "especially from a continental mass to the eastward." He admits that the gneissic region of the Atlantic slope of the Appalachians is Laurentian; but I

had already, in 1870, asserted the eozoic, and, in part, the Laurentian age of these rocks, hitherto regarded, in great part, as altered paleozoic strata. While it is gratifying to find my views on these points (and, in fact, my entire scheme for "reconstructing the whole foundation of theoretic geology on the basis of a solid earth") adopted by Prof. Le Conte, I deem it but right to call attention to the priority of my own conclusions.

VII.

ON MARTIN BEHAIM'S GLOBE, AND HIS INFLUENCE UPON GEOGRAPHICAL SCIENCE.

By Rev. Mytton Maury.

READ MARCH 19TH, 1872.

As early as the first half of the twelfth century the city of Nuremberg had attained a position of importance among the cities of Central Europe. Her internal commerce was prodigious. In her relations to the East India trade she might be called an inland Venice. To her mart flocked merchants and traders from the surrounding region to supply themselves with the costly products of the distant East. Here were consigned silks and shawls of exquisite texture, wrought by the deft and delicate hands of the children of the sun—jewels from Golconda's mines—spices that grew by Ganges' stream; and from her teeming magazines these articles of Oriental luxury were dispensed to enhance the comfort and gratify the taste of the barbarians of the west.

The tolls that are levied at her gates make her revenue more than regal: magnificent churches arise, their shrines embellished with the costliest gems of art; palaces literally crown her well-stored warehouses; wealth multiplies; power grows. Six thousand warriors are equipped by her citizens to serve in the Imperial armies. Once and again she is deemed worthy the presence of the national Diet. Laws for the empire issue from the market-town.

Prominent among the merchant-princes who contributed to the prosperity of this commercial metropolis, we find

the family of Behaim. Originally from Bohemia, as their name imports, they had been driven thence by religious persecution, and found refuge in a city large-minded and large-hearted, where divergence from ecclesiastical orthodoxy was deemed a less flagrant enormity than divergence from practical honesty, and where it was not considered an essential part of the service of God to augment the annual death-rate by the concremation of heretics. Here the Behaims attained no inconsiderable wealth, and maintained a position of high regard in the community.

The acquisition of money, however, is not the solitary object whereon the family concentrates its energy.* To members of a modern geographical society, such as I now have the honor of addressing, one of the Behaims, who lived in the second half of the fifteenth century, and was glorified by the name of Martin, is a personage of singular interest.

In the first place, he furnishes us with authoritative data for ascertaining the condition of geographical science in his day. Among the archives of the family is preserved a token at once of Martin's regard for the city of his nativity, and of his own proficiency in geographical studies. The relic in question is a globe, representing the world as he and his contemporaries supposed it to be constituted. This Martin manufactured in 1492, and presented to the city of Nuremberg.

The map of the globe consists of papier-maché, over which is a crust of gypsum, and over this again parchment is stretched, upon which the drawing is executed. In size, this work of art alone was not imposing, its diameter being only about twenty inches. But it possessed, in the days of its youth, divers other attractions. With a degree of scepticism regarding the interest felt by

* Mathematically speaking, they may be said to have left the multiplication-table and advanced to the process of division—a stage not always reached by men of wealth.

the burgomagisterial mind in geographical studies, Martin sought to popularize the somewhat hard features of Mother Earth by a *ruse* not altogether unknown to beautifiers of the present day. The old lady was gotten up right handsomely; Neptune rejoiced in a domain of brilliant ultra-marine; the lands were brown or green, according, we presume, to their supposed sterility or productiveness; the snowy mountain-crests were of glistening white. The multitudinous and multifarious inscriptions, which render the globe a miniature gazetteer, were made to present a still more popular appearance. Gold and silver, red and yellow letters, impressed even the untutored eye with an idea of the inestimable value of the information imparted. Gabriel Nützel, Paul Volkamer, and Nicolaus Groland, the chief men of the imperial city, who, as Behaim informs us, in an inscription at the north pole of his globe, urged him to construct this elaborate monument of geographical science, must have congratulated themselves upon its goodly appearance.

Time, on the whole, has treated Martin's labor with not a little partiality. True, the gorgeous coloring hath somewhat lost her original glory; the mellowness of antiquity supplants the lustre which bedazzled the eyes of our worthy burgomasters when the distinguished savant presented to their official body this fac-simile of Mother Earth.

But although the ocean of glorious ultramarine is converted into one immense black sea, and the gold hath lost its glittering identity, still the *lines* which show the supposed position and configuration of continents and islands are altogether intact; and the several portions of land and sea retain their names. All is, therefore, preserved which serves in any way as an exponent of the general condition of geographical science in 1492.

We say general with some degree of emphasis; for on examining the globe we find that its constructor represents himself as, in the main, a compiler; and states that his

guides have been Ptolemy, Marco Polo, and Mandeville. And inasmuch as unwarranted assertions have been offered in regard to the geographical *discoveries* made by Behaim, it is as well explicitly to state that this is what he says himself.

While, therefore, the globe of Behaim is not to be taken as an index of its constructor's achievements in geographical discovery, it has extraordinary interest, considered as a fair exponent of the geographical knowledge possessed by himself and his contemporaries.

A glance will show us what this knowledge was, and will reveal the fact that, in some particulars of geographical detail, the darkness supposed to characterize the age of Behaim is more imaginary than real. It is true there is a large amount of romance intermixed with Behaim's incontestible facts.

In regard, for example, to the Island of Zanzibar, Martin borrows from Marco Polo some very poetical items. These are of the greatest interest to the physiologist, and serve also to illustrate in a very striking manner the intrepidity of the missionary to whose efforts the Zanzibarians owe their acquaintance with Christianity. The reverend adventurer, seated conveniently upon the apex of one of their mountains, is encouraging the idolaters at its base to unite with him in prayer. His must needs have been an heroic soul; for his auditors, we are assured, have four times the strength of Europeans, are glorified with great long ears, wide mouths, and appalling eyes, and have hands four times the size of those of ordinary mortals.

Pliny lends a charm to the dry details of geographical fact by supplying our cosmographer with illustrations of the natural history of the globe. Some of the specimens depicted, if judged by zoölogical adepts of the present day to be somewhat difficult to classify with species now recognized, are nevertheless strikingly picturesque. Not far from the equator, mermaids, with golden tresses

and azure eyes, are floating tranquilly upon the waters; in their neighborhood appears a sea-lion, which, with a locomotive apparatus but poorly calculated to give his very terrestrial carcass support upon the briny surface, nevertheless heroically maintains his position; while not very far hence a sea-horse, half submerged, is endeavoring to effect a landing at Cape Verd. A small craft, heading for Antilia, seems threatened with demolition by a parti-colored sea-serpent; while another specimen of more alarming mien is balancing himself upon the convolutions of his tail, a little to the south of the "circulus equinoccialis," and preparing to engulf one of Martin's inscriptions. Besides these are other variations from strict geographical fact, which readily appear on inspection.

With all its errors and defects, however, the globe of Behaim presents a large proportion of correct detail. We, of course, are nowhere. The place of the western continent is occupied by Cathay and adjoining provinces, supposed to be made up, in a large measure, of golden mountains and pearly strands. Setting aside this glaring omission, it is interesting to notice that Africa is represented as being circumnavigable. Importance attaches to this point, inasmuch as the globe was constructed as early as 1492, five years before Vasco de Gama had accomplished the passage to India *via* the Cape of Good Hope. Behaim had obtained his knowledge of this fact from ancient authorities. Phœnician navigators, in the service of Pharaoh Necho, King of Egypt, had circumnavigated this continent; and Xerxes had given orders to one Sataspes to do the same thing. Failing to perform the king's behest, poor Sataspes was impaled, a calamity showing at once the inflexible rigidity of Persian laws, and the certainty felt by the king that the exploit in question could be achieved. Another point of very great interest is that Behaim, who was in Nuremberg, constructing his globe, at the very time at which

Columbus was making his first voyage, and before his return from that voyage, represents nothing in the shape of land larger than Cipango, or Japan, as intervening between Europe and Cathay. This at once involves in suspicion the idea that Columbus was in any sense the originator or exclusive possessor of the idea that steady westward sailing would bring one from Europe to the native country of pearls, gold, and frankincense.

I may perhaps be excused the momentary digression if I add that the suspicion thus suggested by the globe of Behaim is completely divested of all doubtful character by the celebrated letters of Toscanelli to Columbus. These bear date 1474, and contain directions as to the course which Columbus should pursue.

To resume, however, our proper subject. Not alone does Behaim commend himself to our regard as one who was in possession of all the best geographical knowledge of his day. He was not a mere compiler, but indirectly and directly a producer. First let us see how, in an indirect manner, he contributed to enlarge the field of geographical science.

Conspicuous among the extraordinary men of the world figured one, in the fifteenth century, named Müller, and designated, by the piety of his parents, John. Born at Königsberg, or King's Mountain, his is commonly known by a Latin adjective, which commemorates this fact, Regiomontanus.

John of Königsberg (to turn him into respectable English) was one of those mediæval personages who rescue their age from the obnoxious epithet dark. He was a star of no mean magnitude in the intellectual heavens. In the department of mathematical science he may not unfairly be ranked with Des Cartes and Newton. He clearly saw that an absolute prerequisite in his day, for the advancement of scientific investigation, was greater accuracy in the instruments employed.

Those very respectable heretics, the Arabians, had, it

is true, reached some degree of excellence in this line. Among the sins of which they were guilty, during their domination in Europe, was not that of contemning or thwarting scientific pursuits. It appears in the highest degree probable that they made the Castilians acquainted with the use of an instrument called the astrolabe, or star-catcher. What establishes this, with little room for doubt, is that Raimund Lullius,* a Castilian author, writing in 1295 on the *arte de navegar*, describes such an instrument as one of those in use among mariners.

Without entering into details at once unnecessary and unpopular, this apparatus may be described as the modest progenitor of our quadrant and sextant. It enabled the observer on land to determine, with tolerable accuracy, the altitude of the heavenly bodies; for this purpose it had long been in familiar use among the Arabians. "An observatory, in the gardens of the Caliph of Bagdad, contained a quadrant of fifteen cubits in radius and a sextant of forty," while at Samarcand instruments of even greater size were employed.

The Arabians, moreover, we have good reason to suppose, had advanced beyond the mere terrestrial use of this apparatus. The geographer Edrisi, an Arabian, born at Ceuta, in Africa, in 1099, gives in his Geography a description of the Azore Islands, under the name of Hawk or Vulture Islands. It is altogether likely that some of the miscreant navigators had made their way to the islands in question. Possibly the cross-staff, but more probably the astrolabe, had given them the triple casing of brass, which Horace deemed requisite to fortify the adventurous seaman's heart.

As used by the Arabians, however, and introduced by them among the Castilians, the astrolabe did not, and could not, altogether justify its somewhat pretentious title of star-catcher. Sometimes the stars refused to be caught,

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* See Humboldt, *Krit. Unters.*, 1, 235.

and were not in the field when they should have been meekly captured. Such was the construction of the astrolabe that its accuracy depended on the stillness of itself and the observer. Its action was least unsatisfactory when it was suspended from an immovable support. Without much difficulty, therefore, can we appreciate the fact that if such an instrument were affixed to the mast of a moving vessel, the maximum of steadiness and the consequent minimum of error could scarcely be expected. For let us imagine the situation and efforts of an observer on a vessel in a moderately stormy sea. The night is clear, but the waves run high. The craft of the mariner is executing a movement too impressive in its effects upon the delicate human organization to pass from memory or to need description here. What is its influence upon the should-be taker of stars? Those brilliant points, that seem so imperturbably calm, so unutterably dignified, as well-nigh to exclude the idea that they move, are executing a veritable fandango. Not unfairly may even the stars called fixed be stigmatized as *ignes fatui*. Each plunge of the vessel gives them a different apparent altitude. Now they are exalted above, now depressed below their true position, and the perplexed observer has almost to guess where his horizon is, and where the star whose height above that horizon he fondly hopes to determine.

In describing the experiences of Vasco de Gama in his passage round the Cape of Good Hope, Barros quotes, from Pigafetta, an amusing account, which aptly illustrates the inconvenience which that ancient mariner experienced from the cause under consideration. De Gama reaches the Bay of St. Helena, on the coast of Africa, and makes a landing there, partly, said Barros, for the purpose of getting a supply of water, but partly, also, with the idea of getting an accurate determination of the altitude of the sun. "For," he says, in explanation of so singular, so amphibious, a piece of seamanship,

"the Portuguese had only a short time before this availed themselves of the astrolabe in navigation; and the ships of Vasco were small, so that, on account of their plunging, he could place no reliance upon observations made on board." The instrument, therefore, was but poorly adapted to the purposes of the mariner. Regiomontanus well understood its defects, and, in his workshop at Nuremberg, applied himself to its improvement; and what is specially to our present purpose, on turning to the earlier history of M. Behaim, we find that worthy acquiring from the master-spirit of Johann Müller a knowledge of the theory and practice of the astronomy of his age. This is an epoch in Martin's career. In the workshop-study of Regiomontanus is laid the foundation of his after-notoriety.

But the cultivation of science is, alas! not so lucrative as the sale of English and Flemish cloths, which has served hitherto to replenish the family-exchequer; and the fortunes of Martin require that he shall devote himself to the bread-and-butter sciences. To prosecute this not so noble but more needful vocation, he betakes himself to the preëminently commercial kingdom of Portugal. Here he at once achieves distinction as the pupil of Regiomontanus, a mathematician himself of no mean skill, and in course of time he holds rank second to none among the promoters of geographical investigation. Let us see how he attains it. All maritime Europe (Venice alone excepted) was anxious, at the time when Martin betook himself to Portugal, to discover a pathway by sea to the East Indies. For a period of about sixty years Portugal had been conspicuously active in her efforts in this direction. The general method of her discoverers had been to attempt the circumnavigation of Africa. Progress, however, was slow, and we may, perhaps, not unfairly conclude, from the facts in the case, that they were not altogether unprepared to try some other more promising plan. We reach this conclusion from a very

interesting piece of history already alluded to. It was as follows: In 1474, the Canon Fernando Martinez, under instructions from his majesty Alphonzo the Fifth (then sovereign of Portugal), addressed a letter to the too little celebrated Italian philosopher Toscanelli, to ascertain his views in regard to a seaward passage to the Indies. Under date Florence, June 25, 1474, Toscanelli writes, "Although I have frequently discussed the advantages which this course" (of sailing westward) "must of necessity present, yet, inasmuch as his majesty expressly requests it, I will again enter into a detailed explanation of it." He then refers to an inclosed chart, whereon he has indicated the proposed course and marked the islands (many of them, doubtless, Marco Polo's imaginary ones) at which the voyager can conveniently land. In a letter addressed at the same time to Columbus, and referring to the plan which he has proposed to King Alphonso, he observes that it is far less difficult than is usually supposed. "On the contrary," he urges, "the chart inclosed demonstrates that the transit from the west coast of Europe to the Indies can be successfully accomplished by the course which I have indicated." Toscanelli was, of course, right, if we substitute America for Cathay, and the West for the East Indies.

To carry out, however, the plan which he had thus suggested to the somewhat discouraged Portuguese, something more than a clearly-drawn and accurate chart was required. The navigator who should follow the sailing directions of Toscanelli must be possessed of some trustworthy means of ascertaining his position at sea. True, the considerate philosopher had indicated on his chart certain insular resting places where the voyager, if distrustful of the accuracy of his instruments, could, like Vasco de Gama, land, and, under pretext of taking water, take also the sun; but who could fix with any degree of certainty the distances of those islands one from another,—nay, worse

than this, who could even give solid assurance of their bare existence?

As far, indeed, as the Azores and Madeira, a distance of about 1,500 miles, the course was not unfamiliar to the Portuguese ship-masters. On the contrary, a commerce of no inconsiderable magnitude was constantly being carried on between these islands and the mother country. As early as 1419 the vine had been transplanted from Cypress to the islands of Porto Santo and Madeira. In 1449, Prince Henry of Portugal had conducted a colony of Flemings to the Azores. In 1450, forty-two years before the sailing of Columbus from Palos, we find Terceira, one of the group, under the control of a Flemish hereditary governor, while sixteen years later a further accession of Flemish colonists established themselves in the Azores. Thus far, then, the course suggested by Toscanelli was quite familiar to European navigators. But beyond these islands, no unwary mariner, save the long-forgotten Icelandic navigators, had as yet allowed himself to venture. And even in executing the passage to them, the voyager, doubtless, had frequent experience of the unreliability of his instruments, and was led to yearn for some measurer of altitudes that should, more successfully than that which he employed, catch the vagabond stars, and give results equally correct in a stormy or a tranquil sea.

The Portuguese navigators, though discouraged by ill success, were not disposed to abandon their own and their forefathers' plan of reaching India by hugging the coast of Africa, and to adopt Toscanelli's bold suggestion of venturing upon unknown waters, *unless they were first put in possession of some trustworthy means of determining their whereabouts.* To attain this practical object, and thus facilitate the discovery of the seaward passage to India, John the First of Portugal organized a royal commission, composed of the ablest mathematicians and geographers in his kingdom. Of this associa-

tion, the most conspicuous and efficient member was our worthy friend, Martin Behaim. Not in vain had he watched the processes by which the grand master Regiomontanus, in the workshop at Nuremberg, sought to attain superior accuracy in his instruments. Although probably in use among the Arabian seafarers who had, as I have suggested, made their adventurous way from the ports of Western Europe, or of Northern Africa, to the Azores, and although, as appears from the testimony of Raimund Lullius, one of the instruments used by Castilian navigators in 1295, nevertheless the famous astrolabe seems to have been entirely forgotten or to have been designedly laid aside. Explain it as we may, the fact of its disuse appears well-nigh indisputable; for Barros, in giving the account, already quoted, of Vasco de Gama's experience, prefaces what he has to say by observing that the Portuguese had only a short time before the date of De Gama's voyage availed themselves of the use of the astrolabe for the purposes of navigation. Now, the royal association of mathematicians, of which Behaim seems to have been not alone a prominent member, but the factotum, is credited, by all who have written on the subject, with having introduced this instrument to the notice of the Portuguese.

What the influence of this event upon maritime discovery was, is strikingly suggested by a singular historical coincidence.

From the extant letters of Toscanelli to Columbus, bearing date 1474, it is clear that as early as that date Columbus was thinking of putting the theory of Toscanelli to a practical test. But no proposition is made by Columbus to carry out his desire and try the unknown deep until about 1483. When we bear in mind the profound anxiety felt throughout maritime Europe, nd particularly in Spain and Portugal, about the seaward passage to India, the delay of Columbus appears very extraordinary. The question forces itself upon us, why did Columbus, knowing that

every commercial nation of the day was putting forth its utmost effort to secure the benefits expected from the discovery of the seaward passage, postpone for about ten years informing the Portuguese sovereign that he was prepared to carry out Toscanelli's views?

It certainly appears not very unreasonable to conjecture that Columbus did not, up to the date of 1483, feel himself fully prepared to do this. And, furthermore, it does not appear very unreasonable, but the reverse, to conjecture that the thing which induced him to make his proposition at all was that Martin Behaim and his colleagues put into his possession a means of ascertaining a vessel's position at sea, which hitherto was unknown to him. About 1483, probably as early as 1481, the royal commission was organized; in 1483 Columbus offers to undertake his voyage. The coincidence is not devoid of significance.

It strongly suggests that, indirectly, our Martin exercised no inconsiderable influence in bringing about the discovery of America, and otherwise furthering nautical investigation.

This conclusion receives corroboration from the fact that Vespucci, a companion of Columbus, has left it on record that he owed it to the astrolabe that he had been able to direct his course upon the ocean. If the friend of Columbus employed the instrument, we are not altogether unwarranted in concluding that Columbus himself was not unacquainted with its value.

We are in the habit of glorifying the heroism of the navigators who have ventured upon the untried waters in search of unknown lands. Columbus, Vasco de Gama, Cabot, Magellan are all heroes of nautical and geographical history. It is well! Yet, perhaps, there are other some who should have their meed of glory. Small is the justice done to the quiet, thoughtful men of science, like Toscanelli, Regiomontanus, and Behaim, whose labors actually rendered possible the achievements of the heroes

aforesaid, and stripped their voyages of almost everything resembling extraordinary hazard; who distinctly projected the mariner's course for him, upon charts (with some imaginary items of geographical science, it must be confessed, but still, in the main, with remarkable truth); and whose instruments and almanacs, the results of patient labor and profound calculation, enabled him to follow the indicated course with undeviating accuracy.

It should furthermore be remembered, in awarding the meed of merit, that the men of science wrought with nobler aim than did the men of the sea. Mediæval voyages of discovery were eminently speculative in their character. Every mariner expected to reach the Indies. His vessel should plough the waters which rolled upon golden shores; pearls and gems should freight his returning craft; and, more than this, annual tribute of all the treasures of Eastern luxury should make his revenue more than princely. Columbus, with inflexible tenacity, insisted that he should be viceroy of all lands discovered by him, and should have a large proportion of the profits of every species of traffic that should be carried on between those lands and Portugal. Magellan made similar judicious stipulations. Verily was there somewhat of the sublunary and the carnal in the heroism of these ancient mariners.

All glory, say we, to those men, who, if they were not actually engaged in the work of discovery, yet made it possible for others of inferior ability to accomplish that work; who resemble the artist, when, having detected in the shapeless stone a form of life and beauty, he leaves it to a rude artisan to develop what his dull thought could not possibly have devised.

Actual Discoveries.

The question naturally occurs whether Martin, having thus rendered signal aid to the geographical researches of

others, ever *directly* engaged in the work of discovery. He did. Circumstantial evidence, of a very strong character, leads to the belief that he was actually the discoverer of the straits called after Magellan. The facts in the case are these: Herrera, a celebrated Spanish historian of the sixteenth century, narrates that when Magellan made application to the Spaniards for means to carry out his plan of reaching India by sailing westward, he asserted that he felt confident of finding a strait which would conduct him through the newly discovered continent of America, and thus to the pearly shores of India and Cathay. The alleged ground of his confidence was that he had seen such a strait depicted upon a chart made by the distinguished navigator Martin Behaim. Herrera wrote in 1596, only seventy-five years after the return of the surviving companions of Magellan, so that it is not at all unlikely that he may have derived his information directly from some one who took part in the expedition. What, however, so augments the probability of Martin Behaim's having discovered the strait as to render it a moral certainty, is the statement of Pigafetta. Pigafetta, it will be remembered, was a nobleman of Vicenza, who accompanied Magellan and kept a diary of the adventures of the expedition. This composition is unfortunately, as the sailors would say, gone to Davy Jones's locker.

In response, however, to a request from Pope Clement VII, Pigafetta prepared a brief narrative of the expedition, and this still tells its tale. It is preserved in MS. in the Ambrosian Library at Milan. Now, what light does Pigafetta throw upon the question under discussion?

Under date October 21st, 1520, he writes: "We discovered a strait to which we gave the name of the Eleven Thousand Virgins, to whom that day was sacred. This strait is 110 miles long; and sometimes more, sometimes less, than half a mile wide. It opens into another sea which we named the 'Still.' But for the knowledge of

our leader we certainly should have found no outlet to this strait, for we all believed that at the other end it was closed. Our commander, however, knew that he could steer through by following a channel of considerable intricacy, which channel he had seen represented upon a chart that is preserved in the royal treasury of Portugal, and constructed by the celebrated Martin Behaim."

Additional confirmation is given to the idea that our hero was the discoverer of the strait in question, by the fact that for a considerable period it actually bore his name.

In 1561, just forty years after the return of the relics of Magellan's expedition, William Postel, a writer of so much character as to have been expelled from the order of the Jesuits, and to have been persecuted by the Inquisition, wrote a compendium of geographical instruction. Therein he informs his readers that the New World is continuous from pole to pole, save where it is severed at the fifty-fifth degree beyond the equator by *the strait of Martin Behaim.*

Taking all the evidence into consideration, it would seem that the facts in the case not simply allow, but compel, us to regard Martin as the original discoverer of the strait.

In another and even more important field, Martin Behaim contributed, by personal exertion, to the advancement of geographical investigation. It has already been suggested that of the two proposed plans for reaching India by sea, that by sailing perpetually westward and that by circumnavigating Africa, the Portuguese were specially enamored of the latter. Their preference had strong ground of support. It was matter of history that Phœnician navigators, in the service of Pharaoh Necho, had performed the feat. To those accustomed to ocean-telegraphs and steam-freights it may not be uninteresting to note the style of navigation indulged in by these ancient men of the sea. Herodotus says they

sailed out of the Red Sea and pursued a southerly course. At the close of the year they landed, cultivated a suitable portion of ground, waited for the harvest, gathered the fruits of their agricultural efforts, and proceeded on their way. At the end of four years they passed through the Pillars of Hercules, and so through the Mediterranean Sea back to Egypt once more. It was, therefore, matter of fact that the circumnavigation of the African continent could be accomplished.

Owing, however, to want of skill or courage, or perhaps to want of sufficiently reliable instruments of observation, the progress made by the Portuguese was exceedingly slow. Perseverance, nevertheless, was not deficient. Successive expeditions were sent out, with instructions to explore the western coast of the continent as far as possible. The possibilities in the case were usually very limited, until, in 1441, a novel impulse was given to the exploring energy of the Portuguese. In that year Tristano Nano proceeded as far south as Cabo Branco. His fame, however, does not rest altogether upon this achievement. He added to his nautical reputation the somewhat questionable distinction of having been the first to bring marketable negroes into Portugal. This invoice appears to have stimulated the spirit of geographical enterprise not a little. The dusky cargo of Tristano was the first-fruits of a goodly harvest, in whose yield our noble mariners and self-denying discoverers would fain participate.

Accordingly, other navigators are employed, and other expeditions deplete the royal treasury, and occasion disloyal sentiments to be felt, if not uttered, respecting the methods adopted to replenish the national exchequer. The work goes on; Cadarnosto reaches the mouth of the Rio Grande. Prince Henry, surnamed the Navigator, from his large capacity for spending money in the prosecution of geographical enterprise, ceases to voyage upon the tempestuous sea of mortal existence, yet the ardor

for nautical adventure is unquenched. The work has its reward.

Already, in 1469, after a lapse of only thirty years, a lucrative trade has been established in negro slaves and other indigenous products, more or less valuable. Fortunate Portuguese! The national conscience is endowed with elasticity proportioned to the expansion of the national exchequer.

The profits accruing are so considerable that Alphonso, the Most Christian King of Portugal, farms out the darksome traffic to Fernando Gomez, and, in addition to pecuniary tribute, exacts as a condition of the monopoly that the said Gomez shall carry on explorations every year 100 leagues farther down the African coast. Fernando is faithful to his engagement, and becomes an illustrious contributor to geographical science. His expedition crosses the line and brings back important information, most encouraging to future explorers. He has ascertained that the heat experienced in equatorial regions is not sufficient to ignite ships like so much tinder, and that specimens of the Caucasian race are not at once transmuted by it into negroes.

The removal of these apprehensions, which had, perhaps, deterred preceding adventurers from proceeding so far to the southward, deserves honorable mention among contributions to practical science; and we are at a loss which to commend more highly, the sagacity of Alphonso who stipulated that 100 leagues of progress in the circumnavigation of Africa should yearly be made, or the honesty, and, withal, courage, of Gomez, who adhered to his bargain, and carried out the stipulation. However we decide this point, the fact remains that the experience of Gomez greatly emboldened future navigators.

Not alone by his correction of geographical errors, and the removal of unfounded nautical fears, however, did Gomez contribute to the advancement of truth. That

meritorious captain had experience which falls not, alas! to the lot of every man; viz., that virtue brings its own reward. In the regions of heat, whither he ventured in fulfilment of his bargain with Alphonso, he found gold-dust and ivory. These alone might have proved no contemptible amelioration of the hardships which his integrity had led him to encounter; but they were not the only mitigation of his perils. The incorruptible Gomez found negroes, also; and, with the same intensely conscientious desire for their conversion to Christianity which stimulated the worthy forefathers of New England to wage war upon the Indians and enslave them, mingled, perhaps, with a vague impression that they had a certain market-value, the Portuguese navigators, for the greater glory of God, and the salvation of the souls of the negroes, possessed themselves of a cargo of their bodies.

Gomez had done a good work. Whether the glory of God was particularly advanced, or the souls of the dusky savages specially advantaged by the corporal toil to which they were subjected, it is not the time now to inquire.

Certain it is that the valuable returns, secured by Gomez in his progress down the African coast, must have had an effect, upon the work of exploration, of a highly stimulating nature. Fears were dispelled; bright, not to say dazzling, expectations were created by his very successful voyage as far as Cape Santa Catharina, a few degrees below the equator.

The Portuguese are encouraged to prosecute the effort to circumnavigate Africa, rather than attempt the plan suggested by Toscanelli, and now proposed afresh by Columbus. Accordingly, in 1484, 1485, 1486, two expeditions appear to have been sent out, under command of Diogo Cano, but under the scientific direction of Martin Behaim, who held the position of astronomer and cosmographer to the expedition. Under Martin's guidance, decided progress is made. The achievements

of Gomez himself are surpassed; the equator and Santa Catharina are left far to the north, and on the first voyage the eighth degree of south latitude is reached; on the second, the twenty-second degree. In other words, the voyagers proceed about 1,500 miles further than their predecessors. In token of the success thus attained, a pillar of stone is erected upon the shore, bearing upon it the royal arms of Portugal. On his return to Portugal, in 1486, Behaim is treated with marked distinction. He is made Knight of the Order of Christ, the king himself girds on his sword, the crown prince buckles on his spur.

And there was justice in this. Progress of the most important kind had been made. These two voyages of Behaim and his companion were grand steps in the solution of the grand commercial and geographical problem occupying the attention of European savans and statesmen.

In making this statement we are justified by historic fact. The voyage of Bartholomew Diaz, which resulted in the discovery of the Cape of Good Hope, was evidently suggested by the success achieved by Diogo and Behaim. Bartholomew Diaz is despatched, without loss of time, immediately upon the return of the former expedition. He follows so closely in their wake, that he takes with him, as guides, some negroes whom Behaim and his companion had carried home to be christianized. Not unfairly, then, may we assign to Behaim a conspicuous position among those who carried forward, through personal energy and hardship, the work of exploration in the fifteenth century. It is to be considered that what he accomplished so bore upon the final triumph of Vasco de Gama as to be justly entitled the beginning of the end.

And when we recollect that the end in question was the resolution of a geographical problem which, in an unparalleled manner, has influenced the destinies of the world; when we reflect that the final consequences of the resolu-

tion of that problem were the temporary transfer of the East India trade to Portugal; the final destruction of the monopoly long enjoyed by Venice, and the opening of Oriental traffic to the competition of all maritime Europe; the removal of the seat of commercial and political power from the shores of the Mediterranean to the Atlantic coasts; the enrichment of Holland and England; the investing of these Teutonic nations with naval and commercial supremacy and political predominance; the development of the ideas of political and intellectual freedom which conspicuously belong to those nations;—when we bear all this in mind, then, I say, as Anglo-Saxons, as determined enemies of monopoly in thought or in merchandise alike, as strenuous upholders of systems which afford an opportunity to every man's enterprise, we shall feel abundantly willing to render honor to one who prominently shared in bringing about the magnificent result alluded to.

As a geographer, then, who by his globe gives us accurate information as to the state of geographical science in 1492; as one who, indirectly and directly, exerted no inconsiderable influence in advancing that science, I invite you this evening to do honor to Martin Behaim, of Nuremberg.

VIII.

REPORT OF THE RECEPTION TENDERED BY THE AMERICAN GEOGRAPHICAL SOCIETY TO HENRY M. STANLEY, ESQ., ON HIS RETURN FROM CENTRAL AFRICA, AT THE LARGE HALL OF THE COOPER INSTITUTE, ON THE EVENING OF NOVEMBER 26TH, 1872.

ADDRESS OF CHIEF-JUSTICE CHARLES P. DALY, THE PRESIDENT.

LADIES AND GENTLEMEN,—I am sorry to begin the evening by announcing a disappointment, and I shall have to give it to you in the writer's words. It is a letter just received this moment from Mr. Stanley:

FIFTH AVENUE HOTEL,
TUESDAY, *Nov. 27th*, 1872.

MY DEAR SIR,—It is with the utmost reluctance that I have to inform you that, owing to sudden and severe illness, consequent upon the fatigue attending meetings since my arrival, I am quite unable to have the honor of meeting the members of the Geographical Society to-night.

I need hardly say how deeply I regret being unable to attend, and how deeply sensible I am of the honor your Society has done me.

Owing to the excessive strain of the last few days my physician has absolutely insisted upon an interval of rest to-night, but I trust that your Society will give me another opportunity of meeting them and their friends.

I have the honor to remain, dear sir,

Yours, very truly,

HENRY M. STANLEY.

To Hon. C. P. DALY, etc., etc.

I know how great the disappointment will be, but you will, no doubt, excuse it, when you know Mr. Stanley suffered twenty-three attacks of the malarial fever of Africa in his expedition for the discovery of Livingstone, and that he should be suddenly rendered unable, by this attack of illness, to be present with us this night, is a matter which, I think, you will excuse. We propose, therefore, to go on with the ordinary exercises of the meeting, that you may not be disappointed, having come out on this inclement night. Ladies and gentlemen, it will, in some degree, compensate for the absence of Mr. Stanley when I inform you that in the course of the evening we will introduce to you the respected brother of Dr. Livingstone. His presence will, in some degree, compensate for the absence of the deliverer of the great traveller. The circumstance which we are met to-night to mark our appreciation of will hereafter be regarded as one of the most romantic incidents of geographical discovery, —I mean the sending-out of an expedition to search for the greatest of all African travellers, through the munificent liberality of a private individual, and the success of it, through the capacity and perseverance of the gentleman we hoped to welcome here to-night. During the last quarter of a century more has been done to explore and open up the great continent of Africa than had occurred during the same period in the past history of the world. No person has done so much in that great work as Dr. Livingstone. His explorations, in 1849, on Lake Nagami and the country surrounding it; his discovery, in 1851, of the stream flowing to the eastward, and which was afterwards found to be the Zambesi, and his following it up by the still more important discovery of the great network of water in the interior plains of Central Africa flowing eastward and westward; his great journey north-west, I think in 1854, to St. Paul's, on the western coast, until he came to the shores of the Indian Ocean; his explorations of the eastern coast, in 1858, and six years fol-

lowing; and, finally, the extent, interest, and value of his explorations in the vicinity of the equator, constitute, in the aggregate of exploration and discovery, a most wonderful history, and place him at the head of all African travellers. Before his time Central Africa was a blank on the map, as it is so still south of the equator, except in regard to those regions that he has brought to the knowledge of mankind and the world. We feel a deep interest in such a man after twenty years' exploration of the great continent. After six years had transpired from the commencement of his last journey, and several years having elapsed without anything being heard from him, and doubts having been expressed as to whether he was living, it was greatly to the honor of Mr. James Gordon Bennett, who, single-handed and alone, had organized an expedition to search for him, to ascertain his fate, and to rescue him, if alive. How Dr. Livingstone himself appreciated that expedition, the act of Mr. Bennett, and the services that were rendered by Mr. Stanley in the execution of it, he has informed us, by a letter written in Unyanyembe, after Mr. Stanley's return. It will be remembered, ladies and gentlemen, that Mr. Stanley, I think, parted with Dr. Livingstone on the 14th of March last, and in the succeeding July, four months afterwards, and while Mr. Stanley was in London, Dr. Livingstone sent a letter from Unyanyembe to his daughter, which was published in the London *Times* of the 23d of last month, the concluding portion of which I will take the liberty of reading. After telling her that he has entrusted his journal to Mr. Stanley, he adds: "He has proved himself a good Samaritan to me in my sore distress, and I felt, and I still feel, truly grateful. I have written two letters to the *New York Herald*. I meant to keep most of my matter for publication myself; but the very great expense which Mr. Bennett went to in sending Mr. Stanley induced me frankly to give him what would enable him to write a book. It will in his hands do no harm, because

the Americans are good and generous friends." When it is remembered, ladies and gentlemen, the peril that the traveller undergoes, the value that he attaches to his writings, and the pecuniary benefits that follow their publication,—I say, when all this is considered, you will appreciate the magnificent liberality of this heroic traveller. I may say, ladies and gentlemen, in respect to his deliverer, that Mr. Stanley, had he lived in the middle ages, his gallant exploit and deliverance of a Christian gentleman in a Pagan land would have found their way into some ballad, and he would have descended to posterity as one of the heroes of romance. In this age he meets the fate of many travellers. He has come back with something new and unprecedented to relate. I say unprecedented, because a large number of gentlemen had made up their mind that Livingstone was dead, and it is a delicate thing to disturb the pride of those who had formed their opinions or deprive them of the value of their judgments. I might add that Mr. Stanley was not a scientific man; he was not a geographer, not a member of the Geographical Society; I assume this, because he told me he had never heard of the American Geographical Society until he heard of it in the wilds of Africa from Livingstone himself. After adverting to the fact that the researches of Mr. Stanley in Abyssinia and Africa had confirmed the statements of Bruce and other travellers, Judge Daly observed, that it gave him great satisfaction to state that if the Royal Geographical Society of London were anticipated in the worthy work of finding Dr. Livingstone by the greater promptitude of Mr. Bennett, and the marvellous energy of Mr. Stanley, there would be no cause of exclusive triumph here, or of complaint abroad, for Mr. Bennett was a member of their society, and the Royal Geographical Society must, in common with them, rejoice that the heroic old traveller had been found. A year before Mr. Stanley found Dr. Livingstone—while he was engaged in his act of exploration, while he

was pursuing that great network of waters which he supposes to have connection with the source of the Nile, and while he was reposing on the banks of one of those great rivers which he alone has seen—out of the fragments of an old check-book in his possession he sat down and wrote a letter to a Mr. W. S. Stearns, then a merchant of Bombay, and his personal friend, giving an account of his explorations up to that period, and he requested Mr. Stearns to furnish the information to our Society, and was pleased to say that we had always honored him, and that he attached value to our good opinion. In connection with which I may state that I believe the first letter he ever sent, or certainly one of the first, in respect to his explorations in Africa as missionary and traveller, was a letter sent, in 1851, to this Society, and which is published in the first volume of its Transactions. We have the pleasure to-night, as I have said before, of the presence of his brother, and the happy incident of the appearance also of Mr. Stearns, of Bombay, the gentleman to whom that letter was addressed; the one a relative, the other a personal friend, of the distinguished traveller; and I have asked Mr. Stearns, for our gratification as well as for yours, to appear before us this evening and read the letter himself. After that has been done, I will take occasion to call, in an impromptu manner, upon two or three of the gentlemen of the Society present to make up the evening by a few remarks, in the absence of Mr. Stanley, hoping that you will be charitable under the circumstances, and with that we will close the business of the evening. It affords me great pleasure, therefore, to introduce to you Mr. W. S. Stearns.

Speech of William S. Stearns.

Ladies and Gentlemen,—I have been requested to read to you, this evening, a letter which lies before me, and also to make a few remarks upon my connection and acquaintance with Dr. Livingstone. I do not propose to

occupy your time with any lengthy remarks, but simply to state to you that in 1864 Dr. Livingstone was as much a myth to me as he is to you to-day. You have heard of him; some of you, perhaps, have seen him. Many of you never have seen him, and, perhaps, never will see him. But in 1864, the latter part of it, I first became interested in him. In 1865, in June of that year, Dr. Livingstone arrived in Bombay, in the little steamer "Lady Nyarson," which had been sent out, in sections, from England to assist in the exploration of the lakes in the interior of Africa. After performing this work the steamer was sent to Zanzibar for sale. It was afterward thought advisable to bring the vessel to Bombay, and so it came about that on the 6th of June, 1865, the little steamer "Lady Nyarson," scarcely ninety feet in length, sailed into Bombay harbor, under the command and under the guidance of the engineer-in-chief, Dr. Livingstone, the only other men on board being a stoker and a carpenter, with a crew made up of several coolie boys. The same indomitable energy and courage that had enabled him to explore the interior of Africa had guided him, under God and Providence, over a wide waste of 500 miles. In 1865 I found myself in the steamer "Peonellies," and among those present, of our fellow-passengers, was Dr. Livingstone. I made his acquaintance, and formed a friendship which I shall never forget as long as I breathe the breath of life that is in me. On our arrival in Bombay, and during his residence in Bombay, I had the pleasure of offering him a place under my roof. He remained in Bombay about four months, and then early in January, in 1866, he started for Zanzibar and the mouth of the Ruanago River. I will not attempt any personal description of the Doctor, because I am glad to say that his duplicate (pointing to Mr. John Livingstone, who occupied a seat by the side of the chairman) is sitting here. I am also glad to state, for your information and satisfaction, that in a letter which was sent me early last year circum-

stances known only to myself and Dr. Livingstone were referred to, which stamped them as genuine, and as beyond the faintest shadow of a doubt. There are a great many who ask this question. I have heard it many times. It has been put to me a great many times, and there are those here who have, doubtless, heard the same. What purpose is all this waste? Why bury himself in this dark region of Africa? Why refuse to return again to the civilization he has left? It is the same question of old—the question that was put in the days of the Saviour by Judas. We are living examples of what has been brought about by this so-called waste. A question, almost identically the same with this, was asked by the ancient Britons. Dr. Livingstone has done a great and noble work, a work in which he should have every sympathy and every prayer that could be given him. He is opening up a country not only to our knowledge, not only to you, who are interested in geographical progress and geographical discovery, but open, also, to Christian civilization.

The two nations, too, are going hand-in-hand with him in a burning desire to bring the terrible traffic in slavery to an end. Many and many a time have I heard him, with burning lips and flashing eyes, tell the story of the wrongs and frightful cruelties which he had seen enacted under his eyes, and the destruction that had been brought about in that country by the connivance of the Portuguese authorities. By the same means, village after village has been laid waste, and thousands upon thousands of people destroyed. I am glad to see that the English government, and that England, has taken this matter vigorously in hand, and I hope that this land of freedom will assist in this great and noble work, and in exterminating this last great vestige of slavery.

Mr. Stearns then read the following letter:—

New York, *Sept.* 23d, 1872.

Hon. Charles P. Daly,
President American Geographical Society.

Dear Sir,—I have much pleasure in handing you the following extracts from a letter received, through Henry M. Stanley, Esq., the indomitable agent of the *Herald*, from Dr. Livingstone. The Doctor has requested me to furnish you with such extracts as I may think proper to give.

The letter in question was written in Manyema country, in November, 1870. In a late letter, dated Unyanyembe, March 13th, 1872, he says:

"The inclosure was penned long ago, among cannibals, where I had no paper. I give you an idea of matters there; but my own knowledge has been increasing, and perhaps the inclosed statements do not tally exactly with what I have to say now, and much of which will be published in my despatches."

The following portions are those to which he seems to refer in his request:

Letter to Mr. Stearns.

Manyema Country, Central Africa,
November, 1870.

My Dear Stearns,—I have not a scrap of paper, and there are no stores to buy any within a round 1,000 miles, so I cut a leaf out of my Bombay check-book, to offer thanks for all your kind services, and give you a little information about the work that has detained me so long. When I left in 1866, to examine the watershed of South Central Africa, I thought that I could easily do that, though it involved the solution of the problem of the sources of the Nile, in about two years, and then begin a benevolent mission on the slope back to the sea. This last is greatly needed; for our fine, promising mission, begun by good Bishop Mackenzie, has dwindled into the missionary bishop of Central Africa, dawdling at Zanzibar, and taking a peep at his diocese on the main-land, some forty miles off, with a telescope, then becoming sick and going to the Seychelles Islands to recover. He seems to act on Bunyan's (*sic*) principle—

"He that fights and runs away
May live to fight another day."

He blames me for his dawdling; says he was connected with my expedition on the Zambesi, and when I left he had to follow. It must be failure of memory, for he never was connected with me on the expedition in any way whatever. Make me the Bishop of Central Africa, and see how long the fear of death would keep me out of my diocese.

The watershed is in latitude 10° 12′ south. Here stand "Ptolemy's Mountains of the Moon," of no great height, however, between 6,000 and 7,000 feet above the level of the sea, and never clad with snow, at least since the last glacial epoch. And here also the springs of the Nile do unquestionably arise.

The length of the watershed from west to east is between 700 and 800 miles. The springs are innumerable, but all flow away to the north by three lines of drainage; and these which we may call the head-waters of the rivers of Egypt are lakes, with the currents and forms of rivers. If not too pedantic, they are lacustrine rivers. Tanganyika is one, and from twenty to thirty miles broad. I write on the banks of the central one, called Webb's Lualaba, at first eight or ten miles broad, and then holding a width of from two to six miles, as far as it is known. It was long ere I gained a clear idea of the drainage. I had to feel my way, and every step of the way, and was generally groping in the dark, for who cared where the rivers ran? The Portuguese made two or three slaving visits to Cazembee; but they inquired for slaves and ivory alone, and heard of nothing else. Had I left at the end of two years, I could have told little more of this country of dense forests and running rills than they did. I inquired about the waters till I was ashamed, and almost feared that I should be set down as afflicted with hydrocephalus. Many a weary foot I trod ere light shone on the ancient problem. Had I known all the hunger, hardships, toil, and time involved, I might have preferred a straight waistcoat to undertaking the task; but when I had engaged to do it, I could not bear the thought of being beat by difficulties, and I stuck to it with bulldog tenacity.

Native wars were a great hindrance. Illness and medicine lost caused serious delays; unsuitable, cowardly attendants an intolerable drag. By mistaken kindness my liberated slaves were not forced to work, and learn as you and I were. They had all been

slaves, and of the criminal class, in their own country, and feared nothing so much as being caught and made to work again. Some deserted six times over. I look with great anxiety to your freedmen, but they were never of the criminal class in America. I am reduced to inactivity by these worthies, some of whom became eager slave-hunters of their own countrymen when, from fear of guns, there was no danger to them.

I could finish all that remains of the exploration in four or five months if I had men and a canoe. It is the western drainage alone that detains me for work. West of this there are two large rivers, each called Lualaba. These unite and form a large lake, which I am fain to call Lake Lincoln, in honor of him who, by passing the amendment to the United States Constitution, gave freedom to 4,000,000 of slaves. Looking south from this Lake Lincoln, we have a remarkable mound or hill on the watershed that gives out four full-grown, gushing fountains, each of which becomes a large river. One fountain on its south is broad enough for a man not to be seen on the other side. This is the source of the Liambai, or Upper Zambesi. A smaller one on the same side becomes Lucrize, and far down Kafue, where it falls into the Zambesi. I wish to name the large fountain, the source of the Zambesi, after good Lord Palmerston, one on the northern side of the mound after Sir Bartle Frere. Lincoln, Palmerston, and Frere (in Scinde) have done more to abolish slavery and the slave-trade than any of their contemporaries. Lincoln and Palmerston are no longer among us, but in using the names of these great and good men I am fain to place, as it were, my poor little garland of love on their tombs.

Those remarkable fountains, not ten miles apart, are probably the fountains of the Nile mentioned to Herodotus by the secretary of Minerva, in the city of Sais, from which, he said, half the water flowed northward to Egypt and the other half to inner Ethiopia.

The Manyema country is covered largely with forests, from which even the fierce vertical sun is all but excluded. No trader can come here, so the tusks have lain rotting with the other bones where the animals fell. Hordes of half-castes now collect this ivory for a mere trifle. The Manyema are reputed to be cannibals, and had I believed a tenth of what was told by adja-

cent tribes, I might not have ventured among them. My mother never frightened me in infancy with "bogie," etc., so I am not liable to bogiephobia, to which awful disease everything horrible is credited if only imputed to the owner of a dark skin. It raged as an epidemic lately in Jamaica, and the mothers of the Jamaica planters have much to answer. * * * The Geographical Society of New York have always honored me. I need not say that I value their approbation highly. Will you give them extracts from this?

DAVID LIVINGSTONE.

P. S.—If you give extracts to the Geographical Society of New York, it may be right to add that I feel a little regret in being in a manner compelled to speak disparagingly of the opinions of my predecessors. But the claim of discovering the sources of the Nile was put forward so positively, and withal so honestly, that some explanation is necessary in making a similar claim Poor Speke's great mistake was the pursuit of a foregone conclusion. When he discovered Okara, or Victoria Nyanza, he at once leaped to the conclusion that therein lay the sources of the river of Egypt. When he and Grant afterwards went to prove this conclusion to be correct, no sooner did they look toward Okara, than they turned their backs on the *Caput Nili*, the fountains being 500 miles further up the Great Nile valley than the most southern point of their lake. Three lakes, separated by wide spaces from each other, were run into one huge Victoria Nyanza. When they saw that the little river, the so-called White Nile, that comes out of it, would not account for the river of Egypt, but for devotion to the "foregone conclusion," they would have come west, here, into the trough of the Great Valley, and found this Lualaba, not eighty or ninety yards broad, like their little White Nile, but from 4,000 to 8,000 yards; and another, the united stream out of Lake Lincoln, of equally gigantic proportions.

A Dutch lady explorer awakens my sympathy more than Baker, who turned when 700 miles short of the sources, or the second Egyptian expedition that fell short of the same by 1,000 miles. She proceeded with such wise foresight for both land and water exploration, and nobly persevered up the stream in her steamer, in spite of the severest domestic affliction,—the loss of her two

aunts by fever,—and showed such indomitable pluck, that, had she not been assured, honestly enough, no doubt, by Speke and Grant, that they had already found in Okara the source she sought, she must inevitably, by boat or land, have reached the head-waters. I cannot conceive of her stopping short of Bangweolo Lake. We men say explanation was not becoming her sex. Well, considering that more than 1,600 years have elasped since the ancient travellers or traders came in here, and emperors, kings, and philosophers all longed to know the fountains whence flowed the famous river, and longed in vain, explanation does not seem to have been very becoming the other sex either. She came further up than the centurions sent by Nero Cæsar. I know nothing more about her. Many and hearty thanks for your most kind services about the buffaloes. All came safe to Zanzibar, but were entrusted to an ill-conditioned wretch of a Persian Arab, who literally killed them—drove them in a hot sun; then, on reaching a village, tied them up, allowing them neither to eat nor drink. Blood flowed from their nostrils, and they perished. This he wished. Tying them was to avoid all trouble in herding them. He was prepared, and got money to buy grass and water. It was like spending money to buy the light of heaven or the air we breathe. But at Zanzibar they did not know better. I have got no letters for years, save some three years old, at Ujiji, in March, 1868. I don't know my affairs, if I have salary or not. Lord Russell was to give me £500 a year, if I settled, and I don't look like settling anywhere or anything but the sources of the Nile. The expedition-money was for two years, and is all expended long ago. It is, therefore, not without anxious care that I strive to make a complete work of this exploration. * * *

I may say, before I close, that, had I known when writing this letter that I should have been called upon to read it before you this evening, I should have added a few words from another letter, brought me at the same time through Mr. Stanley, and which inclosed this letter which I have been reading, dated Unyanyembe, March 13th, 1872. In it he says: "This letter will be handed you by Henry M. Stanley, Esq., travelling correspondent of the *New York*

Herald, sent out by James Gordon Bennett, Jr., to aid your servant, and right nobly he has fulfilled his task."

Mr. Livingstone Introduced.

The Chairman said it now afforded him great pleasure to introduce to them Mr. John Livingstone, the brother of the great traveller.

Speech of Mr. Livingstone.

Ladies and Gentlemen,—I am very sorry for the disappointment we have met with this evening in not having Mr. Stanley with us. A few minutes before I came here I saw him, and he was quite indisposed and unable to come out; in fact, his medical attendants forbade him to come here to-night, but he hopes before long to have the pleasure of meeting you all here.

The Banquet.

The Chairman said a number of the members of the Society would give a banquet to Mr. Stanley to-morrow (Wednesday), when, they hoped, he would be well enough to be present; but he could only say to those gentlemen who intended going to the banquet that they would proceed with it whether Mr. Stanley was there or not, as a good dinner was not a thing to be abandoned. As it had been impossible to reach all the gentlemen of the Society in the limited time which they had had to make their arrangements in, if there was any gentleman of the Society who desired to be present at the banquet and who had not been invited, he could leave his name with the Secretary. The evening papers had an important despatch with respect to Dr. Livingstone, and, being short, he would read it. It was headed "Another Search for Dr. Livingstone," and ran thus:

London, *November 26th*, 1872.

A despatch from Cairo says the Khedive is about to send a force of 5,000 troops, under command of one of the American

officers now serving in the Egyptian army, to aid Dr. Livingstone, and search for the source of the River Nile.

He would now introduce Dr. Bellows, who would make a few remarks, and then the meeting would adjourn.

Speech by Dr. Bellows.

Dr. Bellows, who was received with considerable applause, said the only improvement which he could suggest to the chairman's remarks was that they should adjourn before listening to him. Still, as they seemed determined that evening to prove a remark which Timothy Titcomb had lately thrown before the public, that the Americans were the best-humored people in the world, he would like to take the opportunity of proving the truth of the observation by referring to the admirable attention which they had given on the occasion under such very exacting circumstances to a meeting made in honor of and to the honor of their absent guest, but which they had been kind enough to accept in so generous a spirit, when those who had been there to present Mr. Stanley to them were prevented at the last moment from carrying out their desire. He thought the admirable equanimity which had prevailed evidenced the carefulness with which they had preconcealed the pain which was in their bosoms, and the patience with which they had listened to these addresses proved that they, as Americans, were the best-mannered people in the world. He had the pleasure of seeing Mr. Stanley, like the other gentlemen who had addressed them, and he assured them they did not know how much they had lost in not having had the chance of looking on the man who so recently stood face to face with Livingstone. They would see in him that resolution and that persistency which had carried him through that critical trial; they would see in his face that Abyssinia and Africa had left their marks on him in a very conspicuous manner, and they would then have understood with what determination and success he had carried out that

undertaking. He appreciated in the American people that "hero warmth" to which they were sometimes disparaged by stupid people, who did not like to see others who had done great things in this world recognized. He thought the enthusiasm which they were so willing to display on all such occasions, and for which they were sometimes reproached in the old country for receiving those whose works they had previously heard of, and that the ointment which they poured on their heads was creditable to the people, and it was better to be mistaken and overdo admiration and generosity towards strangers than it was with a coldness to be considering only what was to be done, and to take care they did not overpay them a cent. Great souls made great room for men that were supposed to have great souls, and if little souls came in at the door it did not make the place less splendid or the heart that received them less noble. Now, they all had a natural curiosity to see Mr. Stanley—they desired to take hold of the hand that last held that of the noble Livingstone, and they also wanted to honor the pluck that went after him and found him. It was not Africa that gave to Livingstone his importance; there was something better than the discovery of the source of the Nile, and that was the sense of devotion that lay within his soul. Livingstone was greater than the source of the Nile, and what he had done to assist humanity was in itself worthy of all his efforts in all that he could do. But there was another thing, which was worth reflecting upon. Perhaps there was no other country in the world where any one but a body of savans, or men of sense, or men who had made special investigation into such matters, would have come together and heard so much about the heart of Africa; but what was it in the American breast—that cosmopolitan nation, that nation made up of the kindred of every other nation and of every clime, that was made up by adoption from other countries, what was it that gave that breadth of sympathy to the Ameri-